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TEXTILE WORLD,

and Industrial Record.

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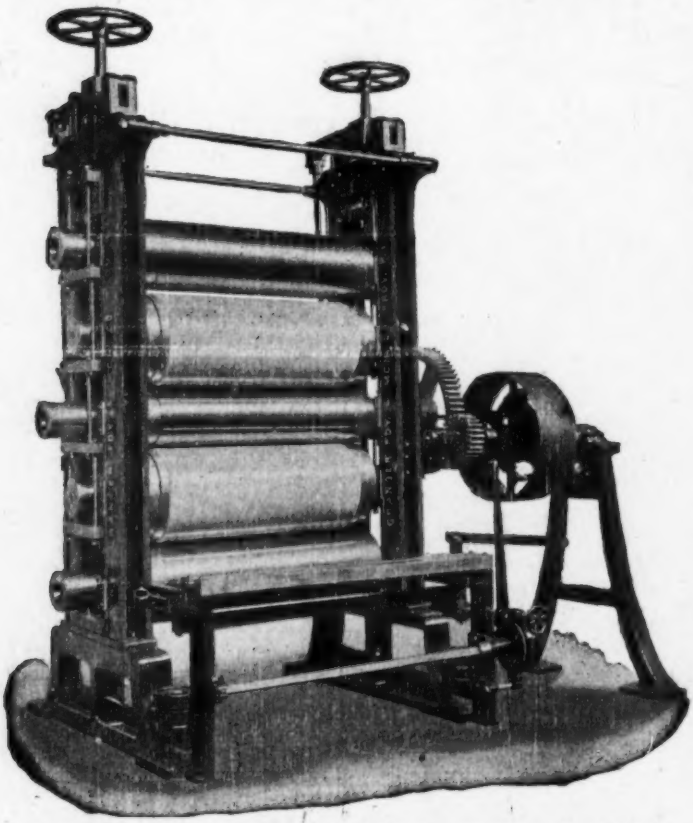
GUILD & LORD,
PUBLISHERS.

620 ATLANTIC AVENUE,
BOSTON, MASS.

Bleaching, Dyeing, Drying,

And Finishing Machinery.



CALENDARS, MANGLES AND ROLLS.

TENTERING MACHINES,
MERCERIZING MACHINES.

Granger Foundry and Machine Co.

PROVIDENCE, R. I.

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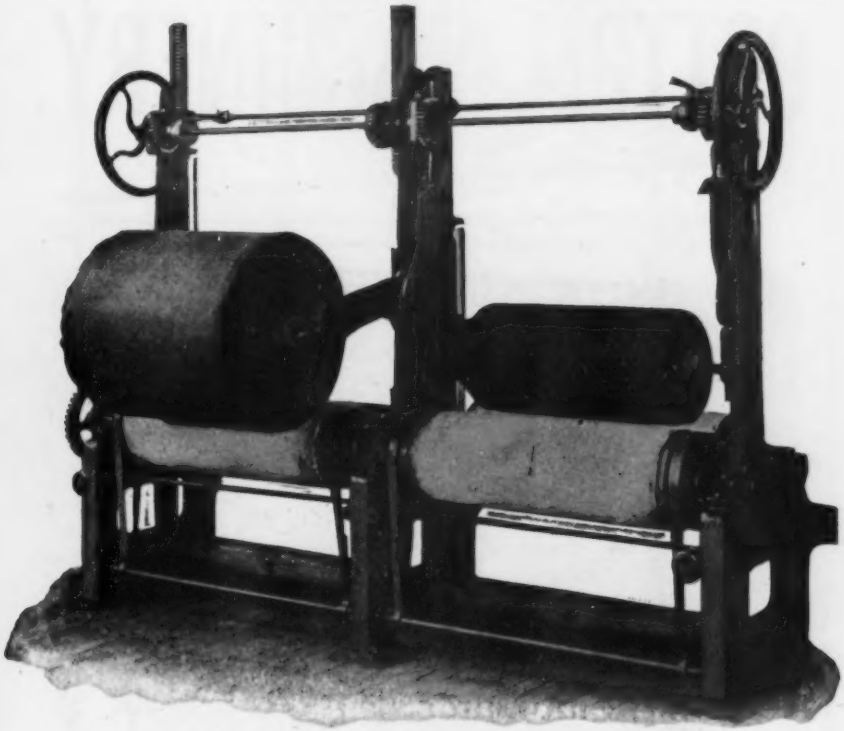
MACHINERY,

For Textile Fabrics



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W. P. SIMPSON, Patentee.

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No stoppage or even "Slacking up" of the machine is necessary.

Cutting is done close to the seam, thus eliminating waste.

As creased ends are avoided at beginning and end of roll, no refinishing is necessary.

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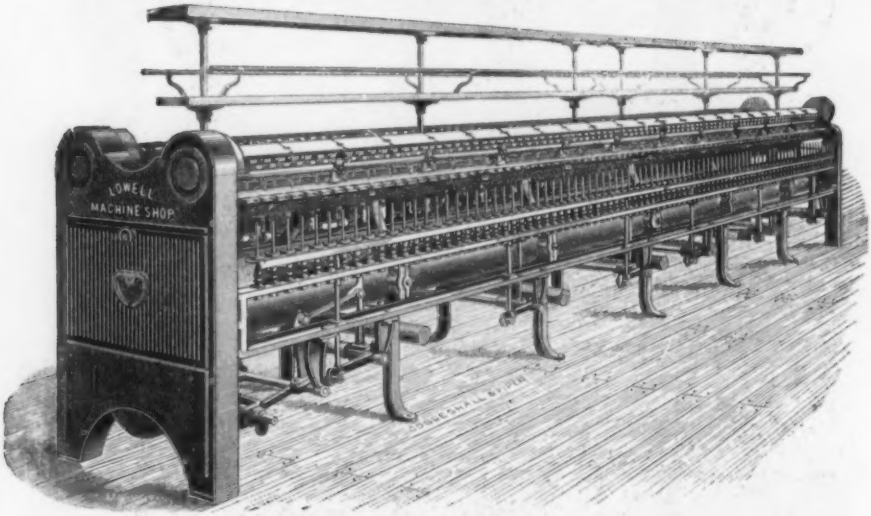
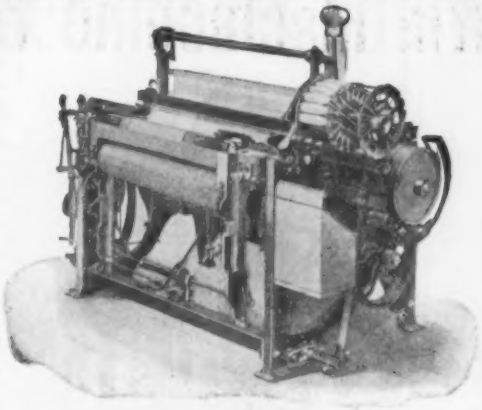


Revolving Flat Cards,
Railway Heads,
Drawing Frames,
Roving Frames,
Ring Spinning Frames,
Twisters, Spoolers,
Warpers, Slashers,
Looms.

WORSTED MACHINERY.



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Business is Improving.

MANY cotton mill managers will, therefore, conclude that they can possibly have a chance to run their old machinery at a profit instead of facing a daily loss.

SHOULD they fail to meet the increased demand by improving their facilities with **new machinery**, they will soon realize that the chance of a profit will bring the competition of **new mills** that will start with the latest and best equipment.

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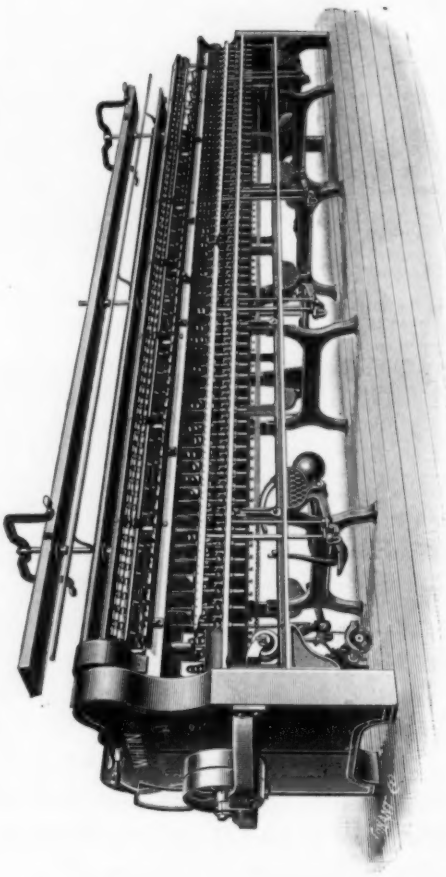

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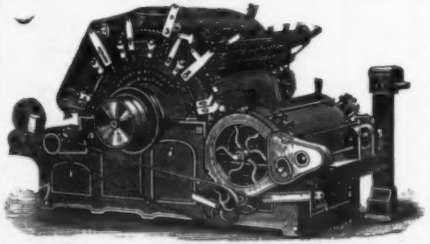

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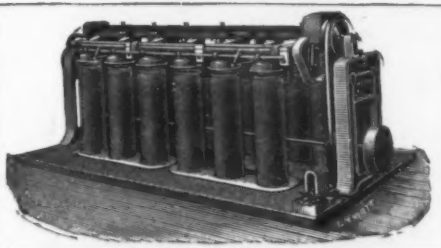

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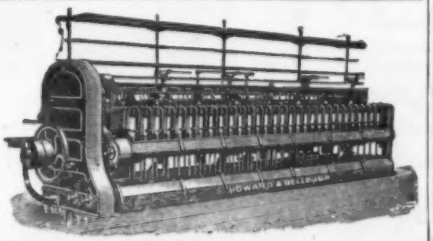

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Second to None

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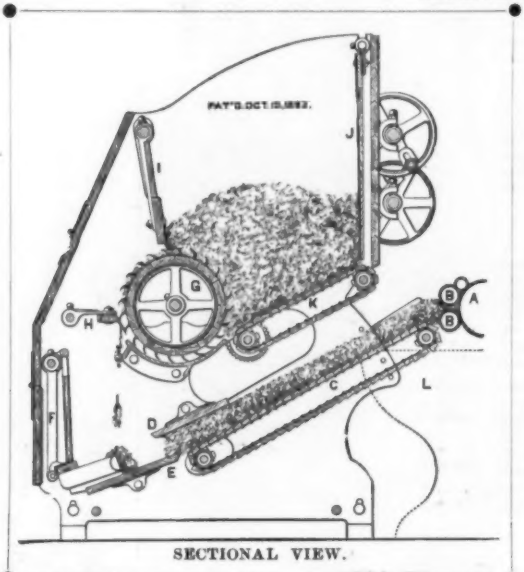
WOONSOCKET WORSTED MILLS,
EDWIN FARNELL. Agent.



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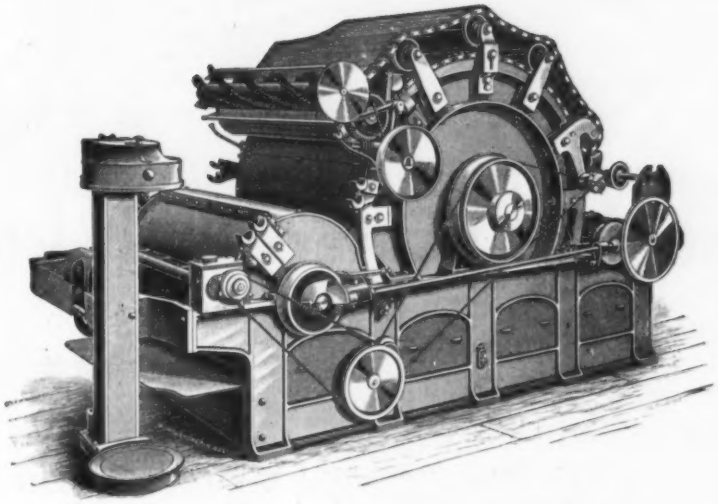

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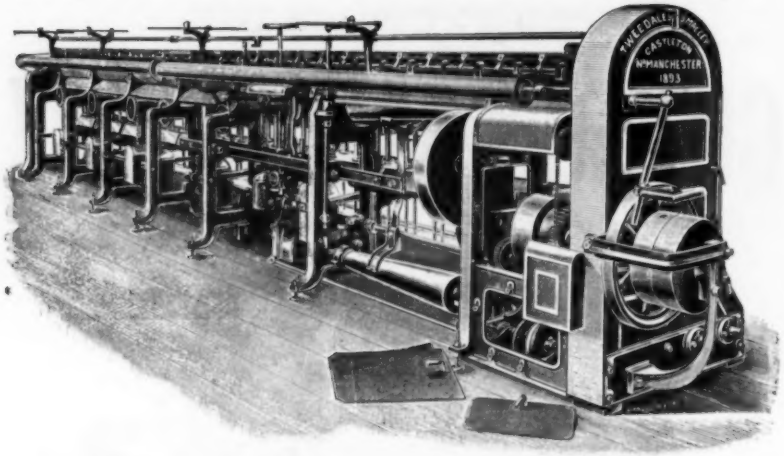

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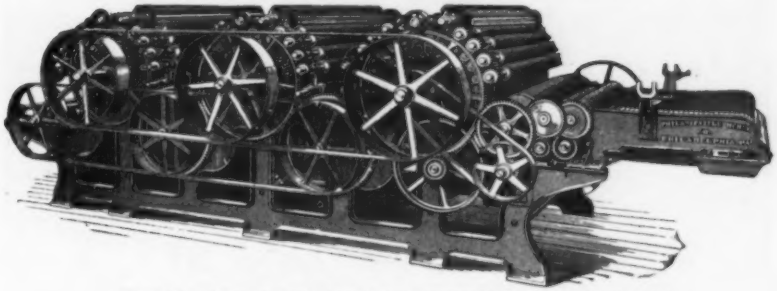

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WOOL
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YARN
UNDERWEAR
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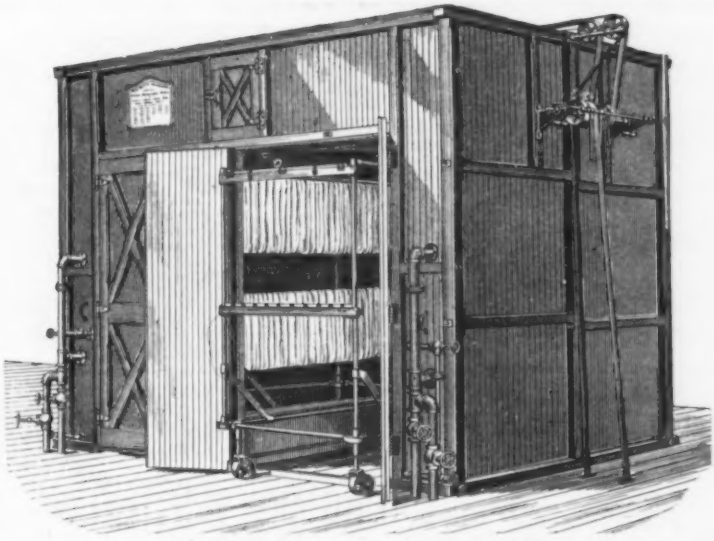

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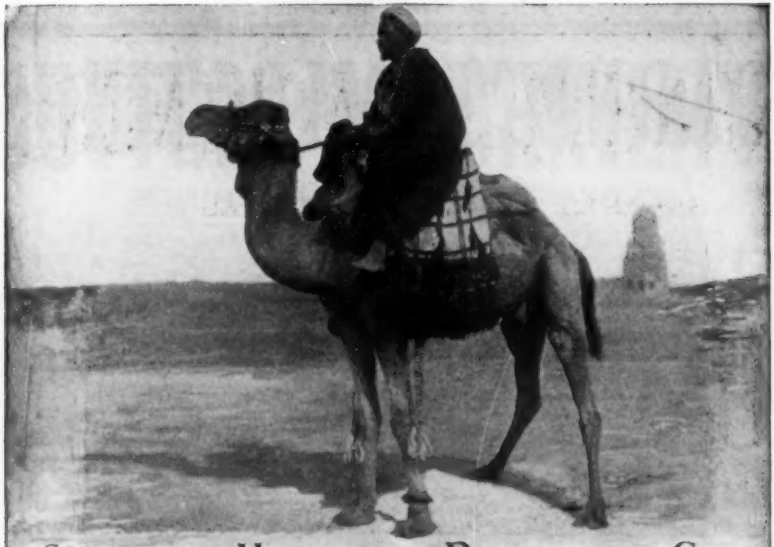

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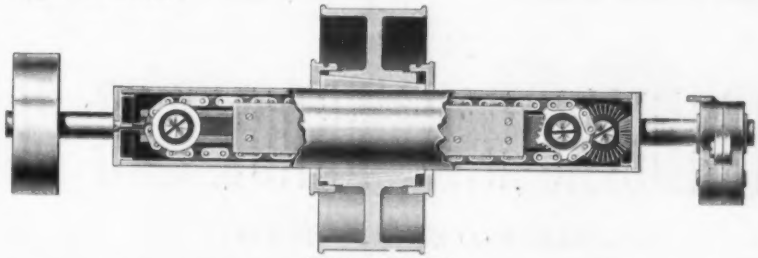

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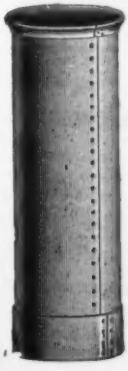

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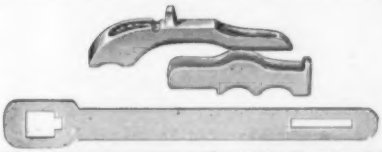

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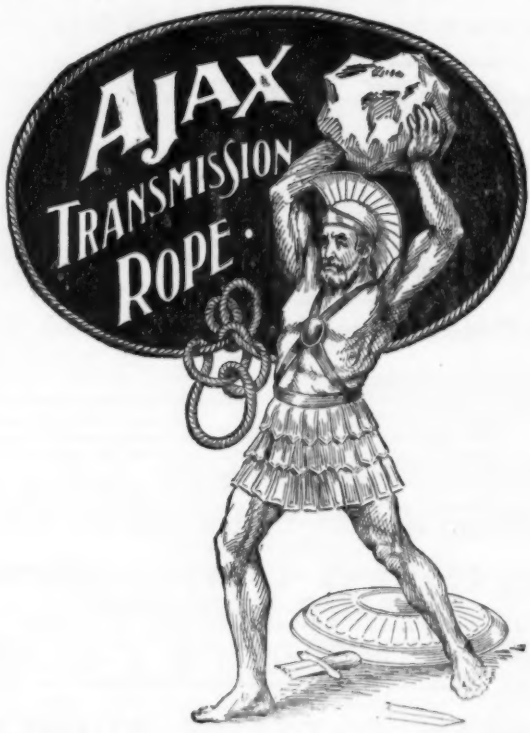

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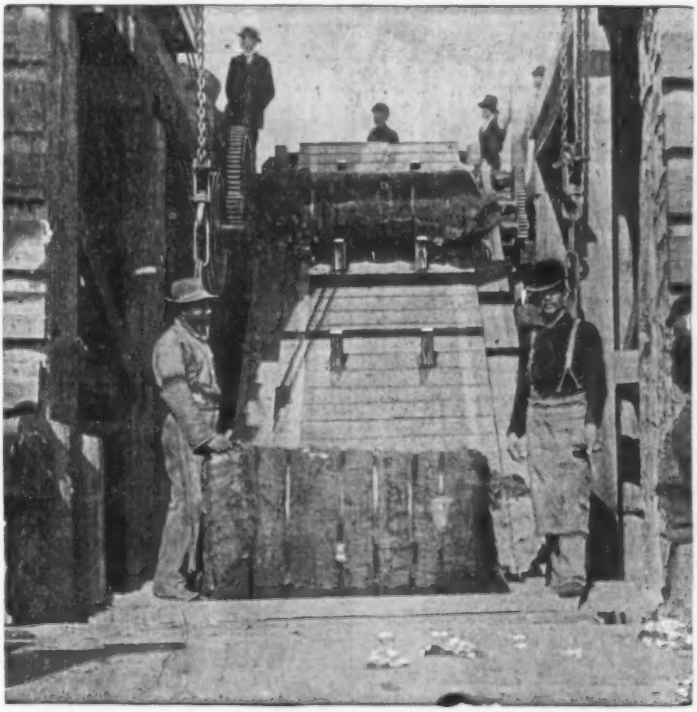

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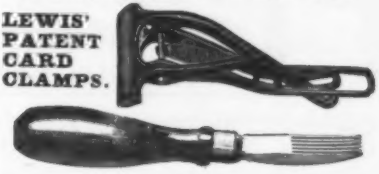

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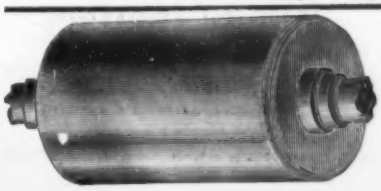

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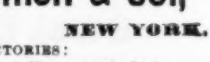

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George W. Gregory, in November, 1874, resigned his position as Principal Examiner U Patent Office to enter the firm.

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Mr. George W. Gregory, of Crosby and Gregory, has taken out for us since January 1875, more than two hundred patents.

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List of Textile Patents.

Issued January 2, 9, 16 and 23, 1900.

Air-Moistener. 640,340. William B. S. Whaley, Columbia, S. C.

Bleaching Powder. Apparatus for Making. 641,610. Frank F. Schmelzer, Erie, Pa.

Braiding Machine. 641,880. Thomas K. Ober, Philadelphia, Pa.

Carding Engine. 640,962. Josef Shaefer, Forst, Germany.

Cloth-Cutter, Electric. 640,192. Fulton Gardner, Chicago, Ill.

Cloth-Piler. 641,921. James B. Barton, Manchester, England.

Cotton, Means for Harvesting. 640,878. Michael S. Curley, Paducah, Ky.

Cotton-Chopper. 641,975. Richard W. Kirby, Cookville, Tex.

Cotton-Seed Planter. 642,050. George W. Murray, Sumter, S. C.

Cotton-Stalks, Machine for Pulling. 641,830. George H. Brush, Ridgely, Tenn., assignor of one-half to Robert L. Keating, same place.

Coiler Head. 641,388, 641,389 and 641,387. Charles L. Hildreth, Lowell, Mass., assignor to the Lowell Machine Shop, same place.

Cop-Skewers, Holder for. 641,765. John V. Cunniff, New Bedford, Mass., assignor to the Draper Company, Hopedale, Mass., and Portland, Me.

Embroidery Frame. 641,604. John B. Oelkers, Newark, N. J.

Fibre-Drawing Machines, weight lifting device for railway heads, or other. 640,786. Arthur W. Mathewson, Lewiston, Me.

Fibre, Raw or Crushed, Machine for Splitting. 641,167. Franz Szymanski, Berlin, Germany.

Knitting Machine, Circular. 641,837. Joseph A. Burleigh, Laconia, N. H., assignor to the American Knitting Machine Company, Providence, R. I.

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Knitting-Machine, Circular. 640,769. Harry A. Houseman, Philadelphia, Pa., assignor to the Standard Machine Company, of Pennsylvania.

Loom. 640,706. Gustav Schaefer and Friedrich Hinkel, Clinton, Mass.

Loom. 640,714. Wallace I. Stimpson, Milford, Mass., and James H. Northrop, Tustin, Cal., assignors to the Draper Company, Hopedale, Mass., and Portland, Me.

Loom. 641,763. Alvah W. Clement, Hopedale, Mass., assignor to the Draper Company, same place, and Portland, Me.

Loom. 641,792. Jonas Northrop and Edward S. Stimpson, Hopedale, Mass., assignors to the Draper Company, same place and Portland, Me.

Loom-Shuttle. 641,815. Wm. H. Walton, Brantford, Can., assignor of one-fourth to John Cook, same place.

Loom. 641,434. John L. Burton, Hopedale, Mass., assignor to the Draper Co., same place and Portland, Me.

Looms, Jacquard Machine for. 641,582. John Dean, Paterson, N. J., assignor of two-thirds to John F. Kerr and George Simpson, same place.

Loom-Temple. 641,631. Nicholas I. Allen, Everett, Mass., assignor to the Draper Company, Hopedale, Mass., and Portland, Me.

Machine for Doubling and Twisting Yarn and for Cop-Forming. 641,398. John F. Lodge, Philadelphia, Pa.

Plush Fabric, Figured Double. 641,978. Henry Langer, New York City, assignor of one-half to Edward F. Timme and Otto Timme, same place.

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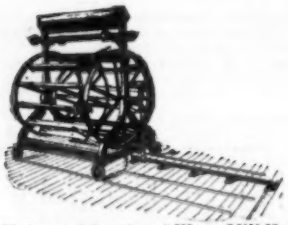

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Roving Machine. 640,874. Malcolm Campbell, Boston, Mass.

Singeing Hosiery, Apparatus for. 641,528. Robert Meyer, Philadelphia, Pa.

Singeing Machine, Hosiery. 641,618. Fred Wunderly, Nazareth, Pa., assignor to Robert Meyer and William C. Foulds, Philadelphia, Pa.

Spindles, Step for. 641,001. George O. Draper, Hopedale, Mass., assignor to the Draper Company, same place, and Portland, Me.

Spinning Machine. 640,716. Ding Cie Sui, Foochow, China, assignor to George S. Miner and William N. Brewster, same place.

Spinning or Twisting Machine. 640,525. Victor Belanger, Marshfield, Mass., assignor to the Rotary Ring Spinning Company, Boston, Mass.

Tentering Machine. 640,229. Ethelbert A. Rusden, Hartford, Conn.

Textile Machinery, Reed for. 641,327. Thomas A. Robinson and Robert L. Shaw, Paterson, N. J.

Twisting and Knotting Threads, Automatic Machine for. 641,707. Albert Kryszat, Berlin, Germany, assignor to Albert Kryszat & Company, same place.

Web Drying Machine. 640,170. Wilson B. Barlow, Canton, N. Y.

Weft-Parter for Automatic Weft-Replenishing Looms. 640,656. Henry I. Harriman, New York City.

Woolen Fabrics, Raising-Gig for. 640,520. John Bailey, Dewsbury, England.

Woven Fabric. 641,007. Chas. W. Gilbert and Charles C. Shepard, Worcester, Mass., assignors to L. C. Chase & Company, Boston, Mass.

Woven Fabrics, Machine for Raising and Dressing. 641,352. Charles Wood, Heaton Norris, England.

Yarn-Spooling Machine, Spool-Lifter for. 640,474. Fred Lacey, Valleyfield, Quebec.

Yarn-Winding Machinery. 641,420. John D. Whyte, Urmston, England, assignor to the Whytes Patents, Ltd., Manchester, England.

—The year of 1899 closed with every English spinner and manufacturer busy, and, unless he was very foolish, making handsome profits. The price of the 60s top, which was at 20½d. scarcely more than twelve months ago, is now 33½d., and the 40s crossbred, which was at 10d., is now 13d. Yarns have advanced in like manner, and worsted coatings have gone up two shillings a yard or more. Even English and Irish wool-staplers have had a turn of profitable business, after a long series of years of heartbreaking disappointment, if not of actual disaster.

THOMAS FIRTH.

TEXTILE WORLD.

Vol. XVIII. FEBRUARY, 1900. No. 2.

THOMAS FIRTH.

Thomas Firth was born Oct. 6, 1842, at Yorkshire, England, his parents being Thomas and Anna (Sharp) Firth. In his early life Mr. Firth attended the Episcopal day-schools in his native town, but as he left them at the early age of twelve, his acquaintance with the progress of affairs and with educational and commercial matters has been largely self-learned. After leaving the schools he received no other education, but at once entered an establishment to learn the dyeing business, which pursuit he has followed ever since. In common with not a few other American manufacturers and industrial workers of note, he learned the first principles of his business in England, where he served his apprenticeship, in some of those large and prosperous establishments which for a long time furnished the world with a large part of its necessities. Acquiring an intimate knowledge of dyeing in all its branches, and at the same time imbibing those business principles which had so firmly shaped the large industrial concerns of his native place, he was fully prepared to enter any field of commerce, and, accordingly, when he came to this country, which was in 1862, he lost no time in putting himself in touch with the new conditions in order that he might be able to make the best use of his extensive knowledge of his trade. The first business engagement which he secured in this country was with James Derie, Philadelphia, by whom he was employed until 1867. In that year he began the business of dyeing, in company with his brother, leasing the dye-works of the Providence Worsted Mills, at Hestonville, Pa., Oct. 1, 1867. The firm was very successful, and in 1869 removed to 2201 Shamokin St., Fairmount, where Pollock & Henry's carpet mill was purchased and remodeled. The business was conducted under the firm name of Firth & Brother, and their business increased so rapidly that in a comparatively short time they had come to be looked upon as among the most successful operators in their line in Philadelphia. The plant, owing to the increase in their business, proved inadequate, and, in 1876, another property was purchased. After the failure of Schepper Brothers, in 1879, piece dyeing was added to the business, and another partnership was formed with Foster Brothers, who were the dyers for the defunct organization. The new title was Firth Brothers & Co., and the firm continued to do business as such until 1883, when Mr. Firth's brother retired and the name was again changed, this time to Firth & Foster Brothers. On the first day of April, 1896, Jos. R. Foster retired from the concern, at which time the present title of Firth & Foster Company was adopted, John H. Foster being the surviving member. The business at the present time is one of the most successful in Pennsylvania, many new ideas having been introduced into the management of the industry. The factory is now located at York, Emerald, Boston Ave., and Adams Sts., covering over 3 acres of ground.

As Councilman from the Nineteenth Ward, to which office Mr. Firth was elected in 1885, he has given evidence

of the possession of high managerial ability and great trustworthiness in other than industrial lines. In the more than 14 years of service which he had seen in Councils, he invariably adhered to the trust reposed in him by the people, and he won an enviable record as a municipal legislator. Mr. Firth was a Mason, and belonged to the Knights Templar, etc. He was a member of the Manufacturers' Club, Columbia Club, and the Anti-Cobden Club, and the Trades League, in addition to many minor organizations.

In September, 1865, Mr. Firth was married to Mary Jane Marks, who died about 2 years ago. Mr. Firth had seven children, and his home life was a very pleasant one. During the winter he resided at 123 Susquehanna Ave., and in the summer at his handsome place at "Lawndale," Second, Pike and Levick Sts.

He died Jan. 14, 1900, in his 58th year.

Hotel Accommodations at the Paris Exposition.

We have just received from the U. S. Asst. Commissioner General, B. D. Woodward, now in Paris, information concerning hotel accommodations that may be expected during the continuance of the Paris Exposition of 1900. A number of hotels are now under construction that will be ready for occupancy very soon, in which a room and service may be had for six francs a day, or room, food, service, etc., for fourteen francs per day from February 1, to April 14, after which time the hotel tariff rates will be advanced.

Visitors to Paris staying at these hotels will have the right to the free transportation of their baggage from and to the station; 14 passes to the exposition if they remain a week, or 20 passes if they remain longer; coupons entitling the holder to a reduction upon purchases made in the large stores which will be specified; a day's carriage trip in Paris; and an insurance policy of 10,000 francs against accidents.

S. C. Lister.

One of the best known manufacturers in England is Samuel C. Lister, of Manningham, Bradford, otherwise known as Lord Masham, who has just completed his 85th year, having been born January 1, 1815. He entered business in early life, and has been distinguished for his tenacity of purpose, which has commanded universal admiration, leading to great commercial success. He is particularly well remembered in his successes with wool combing machinery and with that for the utilization of silk waste. As a mechanical inventor, he has received many distinguished considerations, though his claims in these respects have frequently been brought into question and have been contested in the courts.

The Dyeing of Khaki Cloth.

The process for dyeing khaki is patented. It consists in giving the goods first an acid bath of a chromic or a ferric salt. The oxides are then precipitated by passing the stuff through a bath of alkali. The color is thus produced, and is due to chromic or ferric oxide. It is, however, though fairly fast to alkalies, not sufficiently so to acids. Hence the goods undergo a further treatment with boracic acid or ammonium borate in a bath, or by padding and steaming. The best process is to pad on a solution consisting of about 5 oz. of boracic acid and 12 oz. of 25 per cent. solution of ammonia to 2 gals. of water. A steaming for about twenty minutes concludes the process.

—Nolde & Horst Co., Reading, Pa., whose mill was burned down in December, have ordered 267 of the Paxton & O'Neill ¾ Automatic Knitters, and we understand they intend to equip their new mill exclusively with them and imported full fashioned machines.

—Exactitude in work and exactitude in thought are today absolutely necessary.

BUSINESS PROSPERITY.

It is well to take into calculation a more normal condition of business in the early future than now exists. It cannot reasonably be expected that the activity that we have experienced, with increasing prices, is to last forever. Normal conditions, and even depression, may naturally be expected, in the course of time. These are simply matters to be borne in mind, but so long as they are not present disturbing elements, there is no necessity for any uneasiness. Although the present extreme prosperity of the business affairs of the country has been denominated a "boom," it is clear that it is not purely speculative, but based upon legitimate causes, consistent with the growth and development of the resources of the country and the commercial facilities in the conduct of business transactions throughout the world. Not only have we been experiencing commercial activity, but the same has been true of the manufacturing and commercial affairs of Great Britain. Labor is well employed in all industries, and wages have been advanced on an average of fully ten per cent. Contributory to these conditions is the rapid increase in the population of the country, adding to its consumptive demands, and the reaction from an extraordinary depression in business, as a consequence of the long delay in satisfying public wants, which had been kept within the closest limits of economy. An important element entering into the prosperity of mercantile affairs has been the increased receipts by the government from customs duties and from internal revenue taxes, till now the income of the government is in excess of its expenditures, leaving a large accumulation of gold in the treasury.

Although the current year started with a lighter amount of new business than some expected, it may be well to state that the year started with larger contracts ahead than ever before. Especially does this apply to the woolen, if not to the same extent to the cotton industry.

The condition of the wool market is still unsettled, and though there was a temporary drop in values during last month, it could hardly be denominated other than superficial, as has been subsequently demonstrated. The supply of fine wool is wholly inadequate for the normal demands for such wool, due to well known causes. It may be remarked that the production of River Plate wool during the present season will certainly be 40,000 bales less than last year. One of the results of this comparative scarcity of fine wools is the necessary change in fashion from goods made from such stock to those made from the medium and coarse wools, which can be secured at very much lower prices. The demand for all kinds of wool is such as to draw heavily upon present supplies, unparalleled in the prosperity of the woolen industry, which is perhaps as conspicuously exemplified as it possibly can be in the recent sales of goods made by the American Woolen Company, which amounted in value to fully $10,000,000 as one day's offerings, equal to one-fifth of the annual production of its mills. It is a matter of current report that this company has sold, or contracted for, goods enough to employ the full running capacity of its mills for the next six or eight months. One of the natural consequences of this has been to stiffen the woolen market, for the benefit of the industry in general, enabling it to secure substantial advances in prices of 15 to 20 per cent., or perhaps 33⅓ per cent. above those current a year ago.

The effect of the 1897 customs tariff has had much to do with this improved state of wool manufacturing, as may be noted in the comparatively small imports during 1898 and 1899, as compared with 1897. The value of imports of wool manufactures in 1897 amounted to $40,431,831, while in 1898 and 1899 the values, respectively, amounted to only $15,207,738, and $14,596,847. The American Woolen Company has made a statement that

its profits are now enormous, and that it is making, net, $5,000,000 a year, which is ten per cent. upon the value of its annual production.

The cotton market is somewhat peculiar. Notwithstanding the disturbed political situation in England, the famine in India, and the plague in the Argentine Republic,—the latter two countries important consumers of Manchester goods,—the demand for the raw material among spinners is active. In consequence of this demand, taken in connection with the short supply which has developed, prices have reached the highest quotations in Europe for the season, thus far, with the sentiment in manufacturing circles towards a still further advance. Considering the adverse factors above noted, this condition must be looked upon as being at least singular, and almost unaccountable. The excellent prices that have prevailed for cotton have been of much benefit to planters, enabling them to pay cash for their necessities; which prosperity will probably lead to a disposition to increase the area of cotton production and the purchase of more fertilizers next spring than was the case last spring. The cotton manufacturers of Great Britain do not seem to be taking into their calculations the fear of a prolongation of the war in South Africa. While alluding to the cotton industry of Great Britain, it may be said that this is no exceptional instance in the prosperous conditions that have prevailed throughout the British Kingdom during the last year, when there was an enormous consumption both of necessities and luxuries, due to the improved circumstances of the people. In the last six years, the purchases of foreign goods by Great Britain have increased in value $400,000,000 or nearly 20 per cent. In 1899, the value of imports of foreign products into Great Britain amounted to $2,425,000,000, while in 1893 the value was only $2,025,000,000. In all reason, it must be supposed that the South African war will have an adverse effect upon the manufacturing and commercial interests of Great Britain, resulting in a stringency of money, with much uncertainty as to future prospects, hindering the people entering upon new enterprises or branching out in old ones.

The cotton crop of the United States for the current season will, from present indications, be under, rather than over, 8,600,000 bales. The takings of cotton by both Northern and Southern spinners, are, up to the present time, about ten per cent. greater than was the case last year.

TRUSTS.

We use the word "trust" in its popular acceptation, when referring to the combination of different establishments in the same industry into one corporation under a single management.

The regulation of industrial combinations, has already become the subject for congressional consideration, though in what legalized form it will appear is uncertain. The necessity of some national legislation concerning these large capitalizations of industries is apparent to everyone. Whether it will require an amendment of the constitution to satisfactorily deal with these combinations, is not quite clear, but it would be strange if the constitution, as it now exists, could not be so construed as to permit of the necessary legislation for the regulation of these interests, especially if they should partake of an interstate character. It is not expected that congress will take any drastic measures at present, but enact some general regulations of a moderate nature, enough to give to the federal courts a jurisdiction. A tax of one-tenth of one per cent. on the capital per year may be all that will be attempted, at present, not for revenue purposes so much as to give judicial authority to the federal government, though this tax would probably yield an annual income of $3,000,000 to $4,000,000.

The year 1899 will be remembered in the financial history of the country for the number of industrial consolidations, as a new factor in business af-

fairs. The total capitalization for 1899 of these combinations is put at over five billion dollars, consisting chiefly of what is known as common stock, the larger portion of which is recognized as so much "water," or capital based on earning capacity, rather than an actual investment of cash. Among the well known combinations may be mentioned the American Woolen Company, with an authorized capital of $65,000,000, $40,000,000 of which consists of common stock; New England Cotton Yarn Company, with a capital of $11.500,000, and an issue of bonds to the extent of $5,700,000; United States Bobbin & Shuttle Company, with a capital of $2,000,000, more than one-half of which is common. The consolidation of the print cloth mills of Fall River, with a proposed capital of $40,000,000, may be considered as pending, possibly, but it is doubtful if anything real will be accomplished. The proposed consolidations of certain woolen and worsted mills under the names of the National Woolen Company and the United States Worsted Company, with a capital of $50,000,000 in the first instance, and $65,000,000 in the second instance, have been abandoned. Some new companies, not consolidations, have been floated during the past year. Among them, of interest to our readers, may be mentioned the National Flax Fibre Company, with a capital of $5,000,000; Planters' Compress Company, $15,000,000; and the Indo-Egyptian Press Company, $15,000,000.

Forty-six concerns in England have associated themselves under a limited organization known as The Calico Printers' Association, with a share capital of $30,000,000, — 6,000,000 shares at $5 each. Five millions of these shares are now to be issued as ordinary shares, and the remainder will be issued hereafter either as five per cent. accumulative preferred shares, or as ordinary shares. Four per cent. perpetual first mortgage debenture stock will be issued to the extent of $16,000,000. About one-third of the debenture stock, and one-fourth of the ordinary shares will be issued to the owners of the properties in part payment of the purchase.

That these combinations have worked in some instances, to the benefit of such concerns as have taken advantage of this form of consolidation, is evidenced in the recent action of the J. & P. Coats Company, of England, in declaring a 40 per cent. annual dividend, including a bonus of ten per cent. This extraordinary dividend was made notwithstanding large appropriations had been devoted to the improvement of the manufacturing properties on a most lavish scale, and a large amount added to the reserve fund and to the depreciation account.

OUR COMMERCE WITH THE ORIENT.

Our commerce with China and the countries of Eastern Asia depends for its development upon what is now known as "the open door" policy of nations, or the removal of unequal restrictions upon imports of merchandise into China and contiguous territory, through customs laws. The United States is as earnest as any other nation in seeing that it stands on a parity with all others for the introduction of its merchandise into Asiatic ports for the consumption of the millions of population that can be made to become active purchasers.

This matter has been taken up, as is well known, by the United States government, with European powers, especially Russia, Germany and France, with the object of securing from them satisfactory assurances regarding an "open door" policy, of equal liberality as that which they may procure for themselves in their commercial relations with China. These assurances have been tentatively given, and probably will be so formulated as to be thoroughly consonant with our views of what should be. They might be of but temporary value to us, if the impression did not exist that we have, as a last resort, the power and disposition to sustain our pretentions by force. In this matter

we have the hearty co-operation of the English government, and, we are inclined to think, of the German government, because of the latter's interest in the distribution of its manufactures throughout the world, which can only be promoted upon a large scale by having foreign markets opened to them on the same plane of liberality as is extended to the most favored nation.

This "open door" policy that is being urged by the United States will undoubtedly have a controlling interest in the legislation that Congress may see fit to enact regarding the government of our Pacific dependencies, which is now being deliberated upon by various Congressional committees, with the purpose of ascertaining the legal limitations of the constitution concerning such territory as comes within the jurisdiction of the United States, but not entitled to the privileges of full-fledged states. The impression is that the majority of those who are studying into this matter will report to the effect that the constitution, even now, permits of regulations by Congress according as expediency may dictate. Should this be the view of Congress, the President will undoubtedly be given a free hand; in which case, the "open door" policy will be applied to all commercial intercourse with our recently acquired territory, the same as is urged upon others affecting China.

The importance of a proper commercial relation with China is one that is fully appreciated, we think, by all those who have looked into our industrial necessities, and the advantages that are to be gained by wholesome laws for promoting our export trade, especially for our manufactures. The future of China, in relation to its commerce with foreign nations, to say nothing about its internal commerce, may, in a limited measure, be comprehended by an examination of recently published maps showing the proposed construction of railways and telegraph lines from the seaports to the interior towns, where a large population exists. These railways will probably be built and in operation within the course of ten or fifteen years, and a vast development of trade will consequently follow. There are now nearly thirty "treaty ports" in China, located not only on the seacoast, but far in the interior. A large population is thus reached, which is sure to have a beneficial effect upon American, as well as other nations' commerce. Thirteen such ports have been opened within the last decade.

The most rapid development of privileges to foreigners, in China, and the introduction of modern commercial methods, have taken place since the war between Japan and China, in 1895. The victory of Japan was of immense importance to the world at large, opening, through treaties, the waters of the principal rivers and canals to citizens of all nations. Though these treaty rights had special reference to privileges granted to Japan, they were of immense advantage to us, as our treaties with China contain the phrase "the most favored nation," which gives us all the benefits accruing to the former country.

The manufacturing industry of China, according to modern methods, has progressed quite rapidly in late years, considering the prejudices that have existed for so many centuries against adopting anything that is foreign. The treaty with Japan permitted the introduction of foreign machinery for manufacturing purposes, with the result that there has been rapid progress in the manufacturing industries of China, especially in the line for the manufacture of cotton goods, steam filatures for reeling the silk from cocoons, electric railways, electric lights, telephones, and many other features tending to the development of manufacturing enterprises. There is no likelihood, however, that any increase in cotton manufacturing in China will curtail the demand for American fabrics, as it will be a long time, notwithstanding the great adeptness of Chinese labor, before

anything will be attempted in the fabrication of fine goods. These latter cannot be made from the short and brashy cotton fibre that is native to China. If fine goods are made, the cotton will have to be obtained from foreign countries that raise a longer and finer staple. For the year 1899, the exports of cotton cloth to China from the United States amounted to 221,000,000 yards, against 115,000,000 yards in 1898, and 19,000,000 in 1890, showing an immense growth in our exports of such goods within the last ten years. There are nine cotton mills in Shanghai, operating 300,000 spindles, and six cotton mills in the interior, operating 90,000 spindles. These mills were in many instances projected with the idea of employing a much greater number of spindles, which will be introduced, probably, as business may warrant. The cost of the cotton mills, as nearly as we can figure it, averages about $20 per spindle. Dividends on these manufacturing enterprises have varied from 3½ to 7 per cent. These results have been obtained with labor that is practically unskilled, very few trained hands being obtainable. It is stated, for instance, that three women are required to do the work at the frame, which in England would be superintended by one operative. The managers, however, report that the quality of labor is steadily improving, as naturally would be the case, and the supply is unlimited.

NATIONAL ASSOCIATION OF MANUFACTURERS.

The next annual convention of the National Association of Manufacturers of the United States of America will be held in Boston, April 24-26. The convention will receive municipal recognition on the part of Boston, and preparations are already being made to give the members a hearty welcome. A deep interest has been manifested in this convention by manufacturers throughout New England. It is intended to make it a specially New England affair, and not confine it to the immediate location of the meeting.

The association has now a membership of over one thousand, embracing many of the largest manufacturing concerns in all lines of industry in the United States. It was organized five years ago, with the special object of promoting and enlarging foreign trade for the manufactured products of this country. Its objects and its methods are wholly consistent with the protection of American industries, in retaining for them the domestic market, which is looked upon as of the greatest importance. The customs tariff is regarded as a business problem, rather than as a matter of political capital, and the rates of duty on imported articles are viewed as a means for equalizing the cost of imported articles with those made in the United States. The tariff views of the Association, therefore, are conservative, as well as protective.

Among the leading aims of the association are the establishment of a department of commerce and industry by the national government; the improvement of patent laws; the support of legislative measures for increasing the efficiency of the American merchant marine; uniform freight classification between different sections of the country; the advocacy of the Nicaraguan canal; the encouragement of the principle of commercial reciprocity as a means of promoting trade between nations; improvements of the consular service by the selection of men for their fitness and merit, and their continuance in office during good behavior and efficiency; the establishment of sample warehouses in different parts of the world; and other things of like character.

Included in its membership may be mentioned the following New England concerns in the textile industry: Salt's Textile Manufacturing Company, Willimantic Linen Company, Cheney Brothers, United States Finishing Company, New England Knitting Company, Berkshire Cotton Manufacturing Company, Hamilton Wool-

en Company, American Woolen Company, Parkhill Manufacturing Company, Draper Company, Talbot Mills, Whittenton Manufacturing Company, Whitin Machine Works, and Crompton & Knowles Loom Works.

At the last executive meeting of this association, the subject of foreign bills of lading was discussed, and action taken for the modification of bills of lading used by steamship companies in foreign trade, for eliminating the injustice done to shippers by the clauses which permit ship owners to deliver goods at foreign ports other than the ports of destination specified in the bills of lading, and exempts them from responsibility for acts of connecting lines in carrying goods to destination. A very important action was taken by the executive board of the association at this last meeting, for the employment of legal counsel, to protect members against prejudice or injury from the operations of laws which are unconstitutional, that impose burdens, or interfere with business in the conduct of interstate commerce. Should any member suffer from causes traceable to the operations of such laws, they have a right to appeal to the association for legal counsel.

The association has also taken up the matter of advocating the establishment of a domestic parcels post system, similar to those of England and Germany, as additional facilities for the transaction of business.

WOOL.

Helmuth Schwartze & Company, in their annual report on wool for 1899, express a decided opinion, considering all the circumstances of trade, as they have, and now, exist, that the prospects for the ensuing year are extremely favorable for a continuation of the flourishing conditions affecting the woolen industry in the world at large. No fear seems to be felt that there will be any materially detrimental effect upon the woolen trade on account of warlike disturbances, or of the extreme cost of wool, especially the fine grades. The prospects, rather, favor the ruling of present, if not higher, prices, not only because of the short supply of wool that exists, but of the excellent demand that will prevail for it. The probabilities are that fashion will so change as to bring the coarse and medium wools more into use, as an economical necessity.

The total value of colonial wools that were imported into Europe and the United States last year was the highest on record, and would have been still higher but for the large quantity of low crossbreds. The value of these imports for 1899 amounted to $138,330,000, as the value of 1,908,000 bales, against $124,850,000, as the value of 2,270,000 bales in 1895; that is, the total value of the colonial wools in 1899 was greatly in excess of that for 1895, notwithstanding the quantity was more than 16 per cent. less.

The cost of Port Philip wool, for instance, per pound, clean, is nearly as high as that quoted in the month of April, 1880, which will be remembered as a period of extreme prices for wool. Within the last three decades there have been three periods of high prices for wool, namely, February, 1872, when Port Philip wool was selling on the basis of 86 cents, clean, in London; April, 1880, when it was selling at 74 cents; and December, 1899, when it was selling at 67 cents.

Merinos and the fine class of crossbreds rose over 60 per cent. during the twelve months ending last December, and the coarser crossbreds from 35 to 40 per cent. The high prices for fine wools may have the tendency of turning more attention to merinos; but how much, it is difficult to say, so long as the present demand exists for the mutton of the crossbreds, which can be so easily provided by present means of transportation from the great sheep raising countries, as Australia and the Argentine Republic.

To show the change in the charac-

ter of the wool supply, it may be noted that the proportion of crossbreds from the River Platt has risen from 17.2 in 1889 to 45.6 per cent. in 1899,—to the relative disadvantage of merino wool.

The consumption of mohair in England, last year, reached the unprecedented figure of 25,000,000 pounds. We note this, as being an item of possible interest to the growing tendency of devoting more attention to the angora goat husbandry in this country.

The growth of the woolen industry in Great Britain is represented in the home consumption of wool, which amounted to over 500,000,000 pounds in 1899, against 350,000,000 pounds as the average of the 1881-85 period, and 280,000,000 pounds as the average of the period of 1861-70.

There was imported into England in 1899, woolen rags, to be used as a wool substitute, to the amount of 72,554,000 pounds, which took the place of so much clean wool. This would apparently give the consumption of shoddy in that country at about 150,000,000 pounds, assuming the popular estimate that one-half of the consumption of woolen rags for shoddy in England is covered by imports.

FOREIGN WOOL IMPORTS.

We give, herewith, certain statistics relating to wool imports for 1899, compiled from those just published by the Bureau of Statistics, Treasury Department, Washington. As will be noted, the consumption of foreign, first and second class wools was exceedingly light, so far as these import figures show. They also reveal the interesting fact that a large portion of our imports of merino, or first class, wool, was re-exported, owing to the better demand for it abroad than in this country, notwithstanding the excellent trade that was had in the domestic wool markets most of last year. All of those exports of foreign wools have been taken from warehouse. The current year began with very little foreign wool in the country, nearly all of which was in warehouse.

OUR IMPORTS FOR 1899.

According to the official report of imports just issued by the government, the value of imports of merchandise into the United States for the calendar year 1899, amounted to $798,845,571, upon which $224,077,131 were collected as duties. Nearly 44 per cent. of the value of the imports came in free of duty. Nearly 33⅓ per cent. of the value of our imports consisted of articles in a crude condition, which entered into the various processes of domestic industry, and nearly 29 per cent. of articles of food. The value of our exports for the same period was $1,252,903,987, showing a great excess in value of exports over imports.

We imported in 1899 over 62,000,000 pounds of cotton, which exceeded the imports of any previous year, made up chiefly of cotton from Egypt. The demand for Egyptian cotton for medium fine yarn is steadily growing in this country. Heretofore, this demand has come from New England mills that spin Nos. 60 and above, but Southern mills, in a few instances, are en-

IMPORTS, EXPORTS AND CONSUMPTION OF FOREIGN WOOL, IN POUNDS.
For calendar year of 1899.

	First Class.		Second Class.		Third Class.	
In warehouse Dec. 31, 1898	20,796,507		17,799		27,110,061	
Imported 12 mos. ending Dec. 31, '99,	18,209,046	39,005,553	6,793,806	6,811,605	80,864,722	117,974,783
Exported 12 mos. ending Dec. 31, '99,	12,633,417		297,478		560,931	
Withdrawn from warehouse for domestic consumption	7,641,755		—		6,633,092	
Entered for immediate consumpt'n,	5,575,629	25,850,801	5,187,188	5,484,666	80,303,791	87,497,814
In warehouse Dec. 31, 1899		13,154,752		1,326,939		30,476,969

tering the field in competition, as shown in the Clover Manufacturing Company, Clover, S. C., which is now using Egyptian cotton exclusively, the first shipment to which mill was sent from Alexandria, via. Boston. Incidentally, we may state that Egyptian cotton comes to us in bales with a density of 40 to 45 pounds to the cubic foot. In our notes last month, in connection with our annual report of new mill construction, we stated that five mills, with a spinning capacity of 36,000 spindles, were erected last year in the South for spinning fine yarn—one mill for combed yarn. This last mill is the one referred to above.

The imports of cotton cloth, mostly bleached or colored, for 1899, were unusually large, reaching a volume of 60,212,473 square yards, at an average value of 13.20 cents per yard, or about 18 cents with the duty added.

As a measure of the consumption and production of our silk mills, it is noted that the imports for 1899 of raw silk, as reeled from the cocoon, amounted to nearly 12,000,000 pounds, against 8,400,000 pounds in 1898, and 10,000,000 pounds in 1897, at a greatly increased value per pound, for 1899, over the two preceding years. Our silk imports come chiefly from Japan.

—It is becoming a recognized fact that the great increase in the consumption of cotton by Southern mills will soon oblige them to look to other sections than their immediate neighborhood for a supply of the raw material. This is already realized in certain sections in the Piedmont region, from North Carolina to Georgia. The demand for cotton by the Southern mills has so increased the price of the staple in the local markets that all of the advantages of low cost that have heretofore existed in their favor against their Northern competitors, are practically wiped out; and in some instances cotton can be delivered at a Northern factory at a lower price than at a Southern factory, especially if the latter requires to draw its supply from a distant trade centre. If the South Carolina mills, for instance, are obliged to go for their long stapled cotton to the Mississippi Valley, they will stand at a greater disadvantage concerning prices than Northern mills, because of the greater freight rates of local transportation lines.

—The trustees of the New Bedford Textile School have gone to work in the right way in their petition to the Massachusetts legislature for additional pecuniary aid from the Commonwealth, by requiring the city of New Bedford to furnish $7000 as its portion of the necessary amount for the support of this school for the current year, provided the state will furnish $18,000. There is no plausible reason that can be advanced to the intelligence of legislators, why a city like New Bedford should not contribute material aid to the support of a school that is so closely identified with its industries, and which is of an acknowledged benefit to the latter. We have not the slightest doubt in our minds but that the legislature will grant the request of the trustees of this school.

—The American Knit Underwear Association have organized for the purpose of regulating prices of fleece-lined underwear, and, considering all of the circumstances, the officials, at least, tell us that they are fairly well satisfied with their efforts. They look upon the undertaking, however, as being simply a sort of a start toward an object which they believe will be accomplished within the next year or two, unless dissensions arise in the ranks of the members, evidence of which, unfortunately, has shown itself, in a measure, at some of the meetings. The association has undertaken a difficult problem for it to carry out successfully, in controlling the action of its members, to say nothing of those outside, when genuine competition sets in, in adjusting an equilibrium between the supply and demand. If the association is to be controlled in the interest of two or three manu-

facturers, or if it should have this appearance, even, it will fail in accomplishing its end. Associations of this kind can govern general policies, but they have never been found of much benefit to their members for regulating the course of trade in such matters as prices and supply.

Heavy Weight Woolens and Worsteds.

The present heavy-weight season has been one of the most peculiar in many years. During the months of November and December the rapid advances in wool set the entire purchasing market on the qui vive, and orders placed were large and numerous. This was particularly true of overcoatings and the clothiers were in great haste to get in on any fabric shown, so that the manufacturers and selling agents had the entire market under their control and it was not until the last week that the buyer awoke to the fact that many advances were inflated values, and has at last gotten over the feverish haste to buy goods.

The overcoating market and the suiting have been opening from day to day from the middle of November to the present time. As soon as a line was ready it was placed on the market and the selling has been continuous, and now that the buyers are playing a waiting game, many agents to secure orders have reduced their prices, and in face of the rapid advance, this has had a particularly demoralizing effect, and the buyers are waiting to see where this will stop, as these reductions have had a tendency to make them very skeptical.

One of the first lines of fancy goods to be shown was a cotton worsted one called "Dandy," by Cooley, Turnbull & Co. This was 25 cents single width. Holmes & Meinhard had two lines of cassimeres at 75 cents and $1.10.

The American Woolen Co. opened the kersey, which was $1.17½ a year ago, at $1.57½; the beaver which was 97½ cents at $1.25; and to provide for those who could not use as expensive a beaver, one at $1.15 was shown; also a cheap kersey at $1.07½. The $1.55 kersey opened at $2.25. They also had a line of Oxford coatings which opened at $1.25, were advanced to $1.30, then to $1.37½ and withdrawn. The clays opened, 11 ounce at $1.20; 12 ounce, $1.25; 14 ounce, $1.40; 16 ounce, $1.57½; 18 ounce, $1.72½; 20 ounce, $1.87½; and a few days later were advanced five cents per yard, although the sale was not rapid, manufacturing clothiers buying conservatively of this fabric. The fancy back gray overcoating which was opened at $2.00 has had a large sale; they also showed the Sawyer fancy back coverts at $2.37½. The "Ray" cassimeres were opened at 90 cents and $1.15, the "Vassalboro" lines at $1.00, $1.12½, $1.25 and $1.37½. The "Anderson" cassimeres at $1.10, and an 18 ounce serge at $1.30; the same fabric was 90 cents last year. The Washington clay mixtures opened at $1.87½ for 18 ounce, showing an advance of 62½ cents over last year's price, the 16 ounce grade being $1.75. To overcome these big advances a cheaper grade was made and opened at $1.50 for 18 ounce, and $1.37½ for 16 ounce. The unfinished worsted made by this same mill a year ago and sold at 95 cents, was opened at $1.25 and a cheaper grade, which is a new fabric, at $1.15.

The Manton fancy worsteds made with a wool back, opened at $1.62½ and were advanced to $1.67½ a few days after.

The Wanskuck Company opened their 22 ounce suiting meltons at $1.50; the kersey which was formerly $1.25, at $1.57½; the former $2.25 kersey at $2.62½; and also brought out new fabrics at $1.75, $2.12½ and $2.25. The $1.25 kersey was opened at $1.62½ and a large line of Oxford overcoatings at $1.50 to $1.85 and $2.85. The standard clays also sold by this company were $1.30 for 12 ounce, $1.45 for 14 ounce, $1.60 for 16 ounce, $1.75 for 18 ounce.

Stevens, Sanford & Handy opened the Elmdale kerseys at $1.62½ and advanced to $1.75.

The Atlas coverts sold by H. W. T. Mali & Co. opened at $2.00 against $1.62½ a year ago, and the Atlas cassimeres were $1.20.

Jacob Wendell & Co. showed an all-wool fancy back covert at $1.90 and a plain back one at $1.05.

Whitman & Phelps opened the Great River cassimeres at $1.35, an advance of 27½ cents over last year's price.

Bossut, Pere & Fils opened the Conanicut cassimeres at $1.12½, a line of cotton worsteds called the Wachusetts at $1.25 less 5 per cent., the Wallum fancy worsteds at $1.20, and the Agawams at $2.87½, as against $2.25 a year ago.

The Kessel department of H. Hahlo & Co. opened the Rona worsteds at $1.05, the Westfields at $1.37½, and an all-wool black thibet at 85 cents, in place of 70 cents a year ago. They also had black and blue cheviots at 67½ and 62½ cents.

Converse, Stanton & Co. opened the Bergen cassimeres at 87½ cents and the Wood Rivers at $1.25.

The Slater $1.25 kersey was opened at $1.62½.

The fabrics made by Dickey and sold last year at 80 cents, opened at $1.00; the Oakland fabric, made by the same firm, opened at 60 cents as against 50 cents a year ago.

A line of cassimeres which has attracted a great deal of attention is one made by the Mississippi Mills and sold at 75 cents and 90 cents for plain yarn effects and $1.00 for twists.

The Clinton Woolen Mills of Clinton, Michigan, opened an attractive cassimere line at $1.12½, same grade 92½ cents a year ago, and a better grade at $1.37½, which was formerly $1.25, and a higher grade at $1.50, previous price $1.40.

The Campbell kerseys were opened at $2.00, and advanced to $2.25 less 5 per cent.

Swift River Silk Mill all-wool cassimeres opened at $2.00, having been advanced from $1.65; the fancy cassimere line was $1.90 as against $1.62½.

Greeley, Cushman & Record had a line of Oxfords at 97½ cents which sold very freely; they also showed worsteds at $1.40, $1.80 and $2.00.

The Fortuna worsteds made by Hetzel opened at $2.00.

The Minerva worsteds shown by Holmes & Meinhard opened at $1.25 and some twist effects at $1.42½. The cassimeres sold by same firm opened at $1.15.

E. T. Steel & Co. opened their fancy worsteds, which were formerly $1.25, at $1.62½, and a line of all worsted goods at $2.00.

The Springfield cassimeres opened at $1.25 to $1.50, and a new fabric was shown, so that these goods appear in a new role.

The Blackington fancy worsteds opened at $1.67½, $1.87½, and $2.05.

Stevens, Sanford & Handy opened fancy worsteds at $1.75, $2.00, $2.12½ and $2.25.

Strong, Hewat & Co. had attractive lines of fancy cheviots at $1.25, $1.37½, $1.50, $1.62½ and $1.75, which lines had a match in those shown by Kernhardt & Allen at $1.25, $1.37½, $1.50 and $1.75.

The fancy worsted line made by the Jamestown Worsted Company opened at $1.25.

Tillotson's fancy worsteds, which are without exception one of the best lines in the market, were opened at $2.67½, less 5 per cent., and $2.75, $2.87½ and $3.25, all less 5 per cent.

The Old Colony worsteds, made with worsted warps and wool filling, opened at $1.75. The Ferndales made by the same manufacturer in all worsted, opened at $2.35.

Bacon & Co. had an all worsted line called Sterling, at $1.75.

The Shackamoxion, sold by J. R. Keim & Co., opened the all worsted grade at $2.00, which was the price of an all worsted line sold by Jacob Wendell & Co., who also had the Norfolk worsteds at $2.37½, $2.45 and $2.87½.

The Urbana Woolen Co. opened their cassimeres, which were cotton carded, at $1.25.

The Oregon City Mills cassimeres opened at $1.62½.

As was previously said, the reduction of prices has put the buyers in a waiting mood; among these reductions may be noted that of the Pontoosuc Co., of a $1.25 cassimere to $1.12½.

The Angora Goat.

We have had so many inquiries concerning Angora goat husbandry, from all parts of the country, during the last year, that we have thought best to give the latest authentic information on the subject, as gathered from the experience of those most successful in this line of industry. There is unquestionably a widespread interest, that has been growing of late years, towards the raising of Angora goats for their hair and hide. From present appearances, this husbandry is destined to extend throughout all parts of the country, and assume a magnitude similar in many respects to that in South Africa. Especially is this apparent for the waste lands as are found in the Rocky Mountain region. As an important factor in the solution of the difficulty involved in the reclamation of our more mountainous districts, this goat bids fair to appreciably lessen the existing difference between the values of our low lying, or level lands, and those, which, owing to their hilly and scrubby character, have heretofore been regarded as having scarcely any productive value.

The accompanying illustrations are

NEAR THE ANGORA RANCH OF H. T. FUCH, TIGER MILL, TEXAS, SEVEN MONTHS' GROWTH OF MOHAIR.

worthy of study, as representing the natural habitat of the goat, and of the animal itself in its most approved form and condition.

The Angora goat is a native of Asia Minor, being found in large numbers in the districts of Angora, Beypazar, Geredeh and Castambol, and although a few flocks exist in the adjacent districts, by far the best animals and purest breeds are said to be confined to these four localities, which are situated at an altitude varying from

2500 to 4500 feet above the level of the sea, Geredeh being the highest, and Angora the lowest. The country sometimes rises to eminences within the line of perpetual snow, and again sinks into valleys, 1000 to 1500 feet deep. The soil of the hills is dry and chalky; the climate is arid and the herbage scant. Some roving tribes are said to keep their flocks on pasture all the year, driving them up the mountain side in summer and down in the valleys during winter. The flocks of some localities show a marked superiority, which is attributed by the natives to the fact that they are constantly kept on the hills and mountain side, where the atmosphere is rarer and more salubrious than on the lower levels, and where a wider range of exercise is afforded. These and other conditions are said to produce healthier animals, and a better kind of fleece.

Although in appearance the goats of these districts are easily distinguished the one from the other, yet for all practical purposes the value of the fibre produced does not differ. They present two leading varieties. The white Angora, the only one which has to any extent been imported into America, has a fleece that is called by the natives "flick." It embraces two elements. The outside covering is a long silky hair of silver whiteness, disposed in pendant spiral ringlets over the surface of the body. It is from five to twelve inches long, and often sweeps the ground. Next the skin is a small quantity of fine downy wool. Another variety of the Angora (wrongly named, however, as it is more properly the common Kurd goat) is distinguished by coarse hair of darker and various hues, with an undercoat of downy wool. The climate of Asia Minor is very changeable and great extremes of heat and cold are experienced. In summer the temperature varies from 70 to 100 degrees F.; and in winter as much as five to six degres below zero is sometimes registered, but the Angora goat does not suffer from these extremes.

Since 1845 the Angora goat industry in the United States has grown to its present magnitude, and, like everything else new, it has had many obstacles to overcome. In that year the sultan of Turkey sent to the Department of Agriculture for a man who understood the raising of cotton. Dr. Davis of South Carolina filled this position for two years and on returning to his native State brought with him nine head of Angoras and two thibets. He disposed of two pairs of these, one of them going to Dr. Amberly, Watertown, New York, and the other to Colonel Peters of Georgia. Colonel Peters was a civil engineer and a man of unusual ability. He was for forty or fifty years a leading fine stock breeder, and in some of his writing stated that none of his live stock furnished him as much pleasure or profit as his angoras. Colonel Peters experimented by crossing these on to common goats, and in 1855 the cross looked so well that he sent to all adjoining States and bought the remains of the Davis importation. Later he made another importation from Turkey of three head, but these were not satisfactory, as they were gummy, and in competition at the World's Fair at New Orleans in 1885 Colonel Peters recognized the superiority of California raised goats, and to get new blood bought four more bucks of Mr. Bailey. Later he bought four more bucks and twelve does. After some years Colonel Peters died and his herd has been scattered.

Probably the first Angora ever brought to California arrived in 1861, and came from the Peters herd; but the first direct importation to this State from Turkey arrived in 1867. There were six head, and these were equally divided between Thomas Butterfield & Son, William Landrum and C. P. Bailey. The same year James Sargent and Dr. Flint got one pair from this importation and Grey & Gilmore bought the remainder, so that all this lot came to California.

Two or three years later Thomas Butterfield & Son brought the Brown

& Diehl importation from Ohio.

In 1870 a Greek by the name of Entychides brought a small importation to California, which were largely purchased by Shirland & Gilmore.

In 1876 Hall & Harris made the last importation direct from Angora. In the Pacific Rural Press of May 24, 1879, Mr. Harris' report of this importation and his expenses in Angora are given at some length. Mr. Bailey had had goats from all of these importations, and, appreciating the need of new blood, imported two bucks from South Africa in 1893.

Experience has proven that goats will do well and can be profitably raised in any locality where sheep thrive; but the best results have been obtained in the dryer, more elevated sections. The low foothill valleys of the Sierras of California, for winter, and the high mountain ranges, for summer, cannot be excelled in any part of the world for excellence of pasturage and natural adaptability to the goat. All the territories are raising goats, and grown goats do well in all; but larger percentages of kids are raised in the southern sections on account of the milder climate.

The points of merit of a pure bred Angora goat are a neat and tapering head, with fineness of horn, which, in case of a female, should be small, and in the male, inclining horizontally towards the back, branching outwards. The carcass of the animal should have a straight outline, so that if the head and tail were cut off, the body would resemble an oblong square. The hair should hang in a solid mass, and should be abundant both at the chest and hind quarters, covering the legs, which are short, down to the hocks. The wool should surround the face, with a thick tuft in front of the horns falling over the forehead. The evener the length and fineness of the hair on all parts of the body, the better the animal. The ears vary very much in size in different animals, being very small in some, and varying through all the intermediate gradations up to a very large size, but the pure angora is invariably "lop-eared."

This goat is of an active temperament, which prompts it to travel over

ANGORA GOATS, THE PROPERTY OF ROBERT DAWSON, SAXONVILLE, MASS.

a great deal of ground in search of its food, and for this reason, while it does not in any way interfere with other stock, it does not like to be herded in the same flock. Sheep, for instance, are too slow in their movements to suit goats, which cover more ground in a day and are more inclined to herd in one bunch and less addicted to scattering. However, exceptions to this rule sometimes exist. Where a few goats are kept among sheep, not herded, the goats will often, for the sake of company, stay with the sheep. They are useful in this connection, as goats almost invariably come home at night, and sheep follow them in, thus often avoiding the danger of having any of the flock killed by dogs or wild animals at night.

Many bear testimony to the excellency of the meat of the Angora goat, and that it is not distinguishable from mutton of the same age and condition. The young wethers make the best of mutton; the meat is rich and juicy, and free from the strong taste so common to the meat of native goats.

In regard to the management of the Angora goat during the kidding seasons, W. G. Hughes, of Texas, writes that "the most marked difference in this respect, as compared with sheep, is that through the kidding season, when instead of allowing the newly born offspring to follow the dam, as is the case with sheep, the kids are kept back in the pen when the flock goes out in the morning. It is not until they are about two months old that it is safe to allow them to run freely with their mothers, as the latter cover too much ground for the strength of the kids. During the earlier weeks of the life of the youngsters they are often allowed to go out of the fold after the flock has gone off for the day. They will then content themselves with nibbling the young grass and leaves within easy access of the pen, never leaving it to go any distance until their dams return at night. Where handled by experienced breeders 100 per cent. of kids are often raised to the number of breeding does, the few losses being made up by twins." C. P. Bailey writes that, "kids should not be allowed to come in Spring till grass is good and the weather warm. Eighty to one hundred per cent of kids should be raised from all does two years old and over."

An indication of good breeding is to be seen in the characteristics of the hair of the fleece. All high grade thoroughbred animals reveal their blood in the curl of the hair, not simply in the wavy, crimpy appearance, common to mohair, merino wool, etc., but in the regular spiral twist of the ringlet order. Dealers have marked these peculiarities in the handling of Turkish and Cape fleeces and skins, and it is looked upon as a very reliable point.

An important point for those about to engage in Angora sheep husbandry is to have a fair assurance that it will pay.

A cross is made in this country by breeding the thoroughbred buck and the native does, and by breeding back the crosses to the thoroughbreds. The fourth cross is hardly distinguishable from the thoroughbred. When confined in small, brushy pastures, they have been profitable in clearing the land. Some of the finest vineyard lands in California have been cleared by goats. A farmer in Eastern Oregon, who has for several years run a small flock of goats in a pasture with dairy cows, says the pasture now produces double the grass it did before he purchased the goats. Lands formerly producing nothing but brush and ferns are now covered with clover and bunch grass.

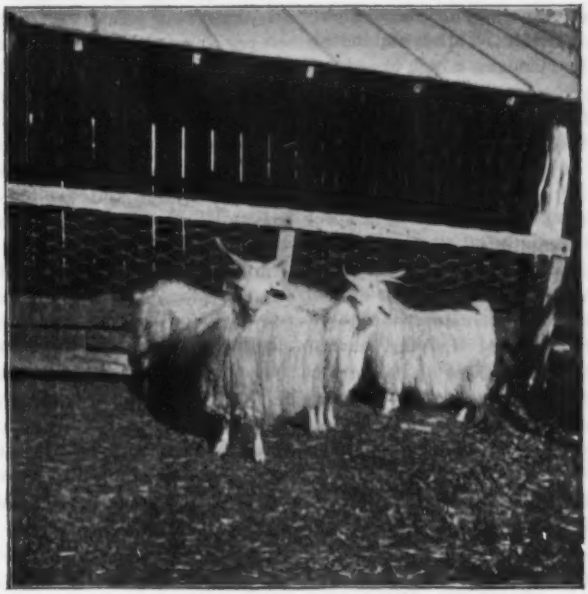
Dr. Stanley of Iowa writes as follows: "Their value as brush-land clearers can hardly be estimated. To a person who has never seen the results of the application of angoras to brush-land, a ride through my blue grass pastures is a revelation. Where three years ago the ground was densely covered with an undergrowth of hazel, crab-tree, oak, blackberry and other brush, it is now growing the finest blue grass. At present I have

over six hundred acres which have been reclaimed, and a conservative estimate would be that the value of the land had thereby been enhanced at least ten dollars an acre."

Where there is an abundance of underbrush, the goats are in their element. The Angora is essentially a browser, and while it will thrive on grassy land, it feels much more at home among hills and scrub brush, and on such a character of range will attain its highest development. Where confined to a limited area they will effectually destroy underbrush by keeping the leaves eaten off. They are sometimes kept with this object in view. Angora goats will live largely on the twigs and bark of sappy underbrush and the leaves of evergreens in winter, and are rarely fed in the South at any time of year; but in more northern latitudes, where feeding and sheltering are necessary, such provision as is usually accorded to sheep will more than suffice to keep angora goats in the same condition

C. P. Bailey, has written us that the year 1899 was a very prosperous one for goat breeders. Good prices for mohair have been obtained, and ready sales have been made for breeding stock. He states that his sales of breeding stock and mohair for last year amounted to about $17,000.

(To be continued.)



ANGORA GOATS, BELONGING TO W. G. HUGHES, HASTINGS, TEXAS.

Yorkshire College.

The excellent reputation of Yorkshire College, Leeds, England, is well known, not only in Europe, but in this country, through its graduates, who have occupied in a number of conspicuous instances positions of responsibility in textile mills. The foundation of this college originated in a meeting held in Leeds, towards the close of the year 1869. In its early history it became associated with the Worshipful Company of Cloth Workers of the City of London, by whose aid the textile industries department was established which it soon afterwards undertook the sole responsibility of maintaining, with an annual contribution for this purpose, of $12,500. This department

consists of Textile Industries (carding, combing, spinning, designing, weaving and cloth finishing); Dyeing (theoretical, research and practical); Art (textile, general and applied). The buildings for instruction in the foregoing subjects were erected at a cost of about $300,000, especially arranged and equipped for their object.

A valuable adjunct to this college is a museum, which is equipped with models of looms and machinery, specimens of materials, fibres, yarns, and a rich assortment of antique and modern woven samples. The students have the privilege of studying the objects in the museum, which are classified in a catalogue, with a view of making them of educational advantage. With the exception of the museum at South Kensington, it is the only one of its kind in Great Britain, and in adding to the collection of specimens and compiling the library of patterns which it possesses, the main purpose is to foster a taste for artistic design and craftsmanship, and to facilitate the study of weaving machinery and of the qualities of the various fibres and yarns used in the weaving industries. The importance of having in connection with a well equipped textile school a museum of this kind cannot be underestimated.

The equipment of the weaving sheds includes twenty-one power looms of various kinds, besides ninety-one hand looms. Every loom is mounted for weaving a different build and style of fabric, with a view of affording as much scope as possible for diversity of pattern designing, whether due to weave or color. Demonstrations are given to the students on the construction and manipulation of the looms; also, on the different types of mechanism for the several motions in power loom weaving. Such experiments as would involve much loss of time, if carried out in the power looms, are performed on the hand looms, which are adapted in their construction to expeditious changes in designing and coloring. Experience has proved to the instructors that for teaching purposes, where the object in weaving should be to illustrate some principle of fabric structure or designing, the hand loom, when suitably equipped, is the best adapted.

According to the 1899-00 catalogue of Yorkshire College, we note that the courses of study comprise both day and evening classes. The principal day course of study is that in which certificates of proficiency in designing, manufacturing and spinning are awarded, and covers three years, but there are also special short courses of one or two years, for students who have already had a preliminary training in other schools, or factories, and a teachers' class is held on Saturdays. The study of any branch of designing or manufacturing may be pursued.

Evening classes cover three or four years' study, and are held on four evenings in the week. The subjects dealt with are designing in all classes of plain and fancy fabrics, weaving mechanism, and textile coloring. The system is similar to that practised in the day classes, only necessarily it can be neither so comprehensive nor elaborate. Though many successful students have passed through the evening classes, yet on account of the limited time available, both for theoretical and practical studies, it is most desirable that, whenever possible, the day course of training should be taken.

The buildings for the spinning classes have only just been completed, but it is anticipated that during the session of 1899-1900 they will be in full operation. The main purpose in the equipment of this department is to be to provide apparatus and machinery for the accurate investigation of the materials used in manufacturing, and of the nature and effect of the different processes in yarn construction. Whilst in every sense the work will be designed on such lines as to be as practical as that performed in the mill, it will be better systematized, and will comprise the keeping of exact records of the data arrived at by scientific tests. As a result of the experimental work, in the course of time the variety

of yarns available for designing will be enlarged on a uniform scheme of coloring. The primary use of the machinery (which will afford facilities for treating wool and wool substitutes from the raw material to the spun thread, whether worsted or woolen), will be the manufacture of yarns for the weaving classes, but a subsidiary yet equally important purpose of the department will be the examination of the fibres, and the testing of the materials and yarns, as well as the fabrics produced from them.

In order that these investigations may be adequately carried out, the department will possess a well equipped conditioning research laboratory, as well as the necessary rooms for scouring, mixing, scribbling, carding, combing, drawing, spinning, warping, and beaming machinery. The department will thus, in conjunction with those of dyeing, weaving and finishing, not only make it possible to teach experimentally as well as theoretically the art of cloth manufacturing from the raw material to the finished fabric, but provide for the systematic testing of materials in the different stages of manufacture.

The influence of textile teaching at the college is readily seen as directly benefiting the weaving and other industries of England. The textile manufacturing industry of Leeds and vicinity has been almost entirely changed since the inauguration of the classes in 1875. Up to that date Leeds was chiefly the centre for plain-cloth weaving, whereas now fancy worsteds and woolens, dress and mantle cloths, as well as heavier makes of fabrics, are produced in its factories; and it is well known that the variety, fineness, and quality of these manufactures are constantly improving, and to this result the teaching given at the college has contributed in no small measure. Such technical instruction as is here imparted tends to create a taste for high-class woven fabrics. Similar effect will be seen in course of time in the textile industries of New England and elsewhere, where textile schools are located.

The dyeing department of the Yorkshire College is represented by a building of considerable dimensions, and so comprehensive in character and equipment as practically to meet every requirement for the purpose of giving a complete theoretical and practical instruction in the art of dyeing in all its branches. The instruction in this department is given by means of lectures and laboratory work, the latter being carried on in the experimental and practical dyehouses, and in the research laboratory. The lectures deal with the fundamental elements and principles of dyeing, and include such subjects as the textile fibres, operations preliminary to dyeing, water, mordants, machinery, theories of dyeing, natural and artificial coloring matters, their methods of application, etc. The lectures are fully illustrated by means of experiments, diagrams, dyed patterns, and specimens of dyestuffs, also with lantern slides of machinery, etc., capable of being exhibited even in broad daylight by means of an arc-light lantern. The note books of the students are periodically examined, and marks are awarded for them in the terminal examinations. The experimental dyehouse is open daily, and students work at times convenient to themselves for periods varying from six hours to thirty-six hours per week. Each student works independently, having a working-place, apparatus, dye-vessels, etc., under his own control. During the earlier period of study a definite course of work is pursued, but later on a student may devote himself more particularly to the special branch of dyeing which he intends eventually to follow. The work consists in carrying out an extended and systematic series of dyeing experiments on a small scale, the object of which is to determine the dyeing properties of all the various coloring matters employed in practice, as well as of new dyestuffs almost daily introduced. The whole course of work is indeed arranged with the view of determining the best method of applying each coloring matter to a variety of textile materials.

In the course of instruction in dyeing, not only is the behavior in the dyebath of each coloring matter investigated, but notes of the results obtained are made by the students during the progress of the work. Further, each student enters in his own book all the patterns received, together with notes of the materials employed, and the results of each experiment.

In the experimental and practical dyehouses the students are taught the art of dyeing; in the Clothworkers' Research Laboratory, they are also urged to study the science of dyeing. The aim here is to assist in the work of gaining a fuller and truer knowledge of the fundamental laws and principles connected with dyestuffs and dyeing, and so help to raise, as far as possible, the whole tone and level of the dyeing trade, by infusing into it the traits of an exact science.

The course of study in decorative design for textile fabrics is arranged under two schemes—one for those who wish to make the decorative side of textile work their special study, and the other for those students who are taking the ordinary textile course. In the former case three days per week are devoted to the art department, during at least one, but, if possible, two sessions; while, in the latter case, one day per week is given to the study of art, generally during the first, second, and occasionally the third sessions of a student's course. In both schemes it will be noticed that the technological and artistic sides of textile work are carried on together, and the course is so arranged that students are not only taught to make designs, but also to work them out practically on the loom.

The head of the department of textile industries is Roberts Beaumont; that of dyeing, J. J. Hummell; that of art, F. Suddards.

New Cotton Baling Systems.

The following systems of baling cottton are now before the public:

American Cotton Company (round-lap bale).

Planters' Compress Company (round bale).

Fordyce Round Bale Company (round bale).

American Cotton Bale Company (metal-covered bale).

Fuller Cotton Machine Company (round bale).

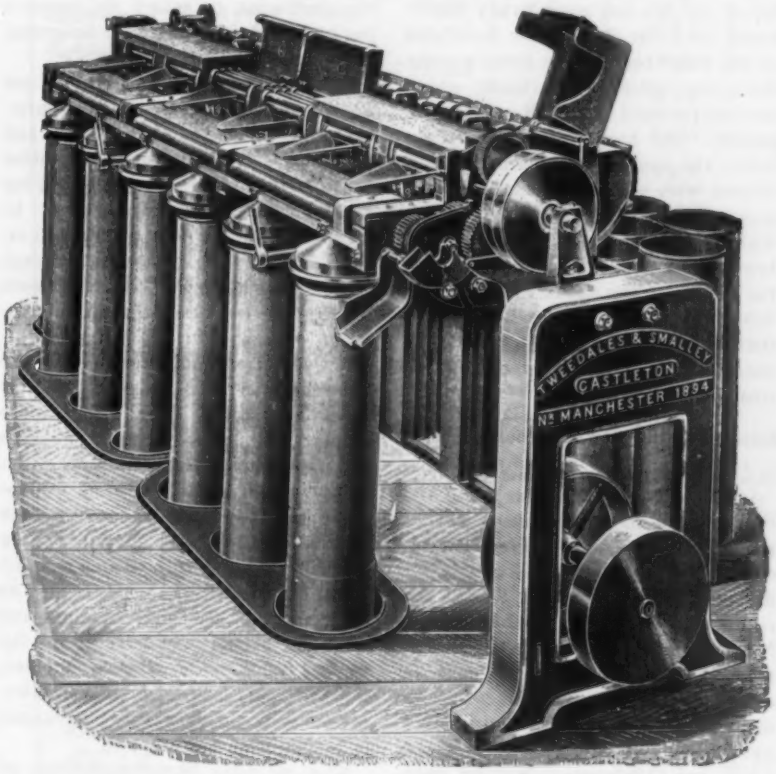
Electric Stop Motion Drawing Frame.

W. G. McKerrow & Co., Agents.

The operation of drawing in the manufacture of cotton yarn is one of the most important processes in the whole line of cotton manufacturing. More thought and discussion have taken place concerning the effect and usefulness of this process than that of any other in a cotton mill. Improvements are being constantly made in drawing-frames, but nearly all of them are necessarily those relating to details rather than to the general principle upon which the machine is constructed and the uses to which it is put.

In this article we desire to call attention to the electric stop motion drawing frame made by Tweedales & Smalley, of Castleton, Eng., represented in the United States by H. G. McKerrow & Co., 31 State Street, Boston. These frames, wherever they have been placed in mills, have made an excellent record for themselves, for good construction and efficiency. The accompanying illustration gives a view of the frame at the front side. A feature of this machine which is regarded as being quite novel, is in the brackets for carrying the roller stands, calender rollers, back plate, and feed-roller bearings, all of which are cast in one piece. The seatings for the front roller bracket and the calender roller bearing are in each bracket milled out by machine simultaneously, so that the distance between the centres of these is always permanently fixed in place by being let into a groove and milled transversely in the main supporting bracket. The upper face of the latter is milled longitudinally at the edges, and the remaining three brackets, for

the second, third and fourth lines of rollers, are milled out underneath to leave two feet, which rest upon the milled edges of the main bracket. In this way the alignment of the roller brackets is accurately preserved, whilst at the same time they can be readily and easily moved transversely of the rollers to allow the position of the latter to be altered for the different lengths of staple of the cotton. Moreover, the roller brackets being milled



to standard gauges are readily interchangeable, so that they may be easily replaced by others if the rollers themselves are changed for those of larger size or become broken during use. The use of combined sustaining brackets for the various rollers is regarded as a very valuable feature for the fixing or setting of the various parts.

By reference to the illustration it will be seen that the fast and loose pulleys are arranged between two bearings. The loose pulley is mounted on a boss formed on the inside of the outer bearing bracket, and adequate provision is made for its lubrication. The fast pulley is fixed to the front roller shaft, and is compounded with a small pinion which communicates the motion to the coiler and calender roller shafts directly from the fast pulley by the intervention of a train of wheels. The teeth of the pinion referred to correspond in number to the number of sixteenths of an inch in the diameter of the front roller, the idea being to establish a uniform velocity ratio between the front roller and the calender and coiler shafts, an arrangement which is well worth the serious attention of cotton spinners. The pinion gears with a change wheel of a large size, so that a small increase or decrease in the velocity of the driven parts can be made to suit the sliver being drawn, no matter what its weight, are arranged for

equalizing the tension. By changing this wheel the speed of the calender rollers and coiler is altered equally, so that the velocity ratio between these two parts is always the same. This practically means that there is no stretching of the sliver or kinking up of it during the coiling, and that by the arrangement of the drive all torsion is taken off the front roller.

Another arrangement is that of the coiler shaft. This is placed above the top of the can and immediately underneath the front plate at the front side of the roller beam. The bevel pinions drive the coiler bevel wheels, which are compounded with the coiler plate pinions. The bevels are immediately below the shaft, and each of them is formed with a shank which fits into a socket of the self-lubricating type, in which all the oil is confined to the bearing. A small hole bored through the centre of the shank admits of oil being introduced to the bearing, so that the wheel-shank is practically running in an oil bath, reducing the wear of the bearing.

Estimating the Cost of Woolen Goods.

(Continued from January.)

In the January issue we gave the outline of a method of cost calculation on woolen goods. Before considering the estimating of the cost of individual fabrics, we wish to call the reader's attention to the statement No. 1, in which the production taken from the monthly report on page 78 of the January issue is reduced to its equivalent yardage. This yardage having the constant number of picks which has been previously fixed upon as a measure of production, 50 picks is here taken for this purpose. The monthly production was 74,250 yards, 36 inches wide. As these goods are woven two widths in the looms, the actual yardage woven was one-half of this amount, or 37,125 yards, 36 picks per inch. Assuming these looms to have been operated with the same efficiency, a cloth having 50 picks per inch instead of 36, a proportionately less yardage would result. A simple calculation giving 26,730 yards of 50 pick goods has this equivalent. As stated in the former article, this reduction of the product to a constant equivalent is made for the purpose of having a standard measure of each product by which to calculate the average cost per yard of the so-called fixed charges and to better compare the product of different months; in other words, one yard of goods containing 50 picks per inch is taken as the yard stick by which we measure the work of the mill and determine the efficiency of its operation.

Two important items of cost do not appear in our statement, viz., interest and depreciation of real estate and machinery. They have been omitted because they vary so widely among different mills, but care should be taken to allow for these charges in estimating the cost of goods, although they do not appear in the statements illustrating our methods of calculation.

Not all of the items grouped under the head of fixed charges are, strictly speaking, fixed. They might more properly be termed general charges and fairly be treated as a charge on every yard of goods produced. For instance, a mill may be making both woolen and worsted goods, buying raw stock for the former and worsted yarns for the latter. Such charges as wool sorting, scouring, carding and spinning belong exclusively to the woolen goods. The expense of office, repairs, fuel, insurance, taxes, interest, etc., should, however, be charged to both woolen and worsted.

Now we come to the estimating of cost of separate fabrics. The estimate sheet here given, together with that on page 78 of the preceding article, will, we think, illustrate this part of the subject.

In concluding this article we wish to add the claim is not made that this particular method is the best that can be adopted. It has, however, been used with satisfactory results in a mill making kerseys, friezes, fancy cassimeres, fancy cheviots, fancy

worsteds and piece dyed woolen and worsted serges.

Most mills are handicapped by having too many fabrics in process at one time. This condition seems to some extent a necessary evil, and under it the question of cost estimate necessarily becomes very intricate.

As said before, it is for the interest of the trade in general and each manufacturer in particular that each manufacturer should know the cost of his product per yard that demoralizing prices may be avoided.

Monthly Statement of Fixed Charges.
of a 12 set woolen mill on Dress Goods,
36" wide — 36 Picks

74250 yds., 36" goods, 36 picks = 26730 yds. full width, 50 picks

Dept.	Product	Labor	Expenses	Average per yard, 50 picks Labor	Expense
Weaving	26730 yds	534.60	57.98	.02	.002
Repairs	"	155.92	51.98	.006	.002
Int & Tax	"		371.25		014
Fuel	"	80.19	348.98	003	013
Freight	"		133.65		005
General	"	482.62	155.92	018	006
		1253.33	1113.76	.047	.042

Cost Estimate of Woolen Cassimere.
15½ ozs. per yard, 6/4.
2800 Ends, 3⅝ Reeds; 68" wide in loom; 50 picks, 3⅝ reeds.
Stock shrinks 15% from clear wool to yarn,
15% " yarn to finished goods.

21 7/10 ozs stock required per yard 42 lbs. .562 Cost of Stock

Manufacturing

	Required per cent	Average Labor	Average Expense	Cost per cent Labor	Cost per cent Expense
Sorting	156 lbs	.0044		.22	
Scouring	63 "	.0034		.21	
Coloring	63 "	.004	.03	.44	1.89
Picking	63 "	.002	.003	.13	.19
Carding & Spin'	221 "	.01	.001	2.21	.22
Spool & Dressing	4 Sections	.056		.39	
Weaving-Piece	50 yds	.089		4.45	
Finishing	47 "	.036	.023	1.69	1.08
Fixed	50 "	.049	.042	2.35	2.10
				$ 12.49	$ 5.48

Cost Stock per yard .562
$12.49 / 47 yds " Labor " " .266
$5.48 / 47 yds " Expense " " .116
Mill Cost per 6/4 yd .944

FEDERAL.

COTTON DEPARTMENT.

American Cotton Spinning Machinery.

ARTICLE XIII.

CHARLES CLIFTON HEDRICK.

(Copyright.)

The production of the card is governed by weight of the sliver per yard and the revolutions of the doffer per minute. Although the doffer is not the actual delivery roll, it is considered in the calculations. To have this fully understood, diagrams, showing the gearing of four of the leading makes of revolving flat cards, are shown in Figures 88, 89, 90 and 91. The gearing of all is very similar, so that whatever calculations are made upon one, may be very easily followed through upon another. These calculations are figured from the gearing shown in Figure 91.

The doffer is 24¾ inches in diameter on the face of the clothing, therefore each revolution that it makes would deliver a length of sliver equal to its circumference, which is 77.75 inches. But after leaving the doffer, the sliver passes between the calender rolls on the card and then between the calender rolls in the coiler box, where in each case it is subjected to a slight draft. This additional draft, or elongation, reduces the weight of the sliver somewhat from what it weighed at the doffer so that, as the calender rolls in the coiler are the actual delivery rolls, the length delivered by them, at each revolution of the doffer, should be considered in figuring the production. These rolls are 2⅛ inches in diameter and make 13.22 revolutions to one of the doffer. This gives a delivery of 88.25 inches for each revolution instead of 77.75 inches, as when taking the actual circumference of the doffer.

Rule 1. To find the production of the card: Multiply together, the revolutions of the doffer per minute, the number of inches delivered at each revolution, the weight of the sliver per yard and the number of minutes run per day. Divide the product by 7000 (the number of grains in one pound) multiplied by 36 (inches per yard.)

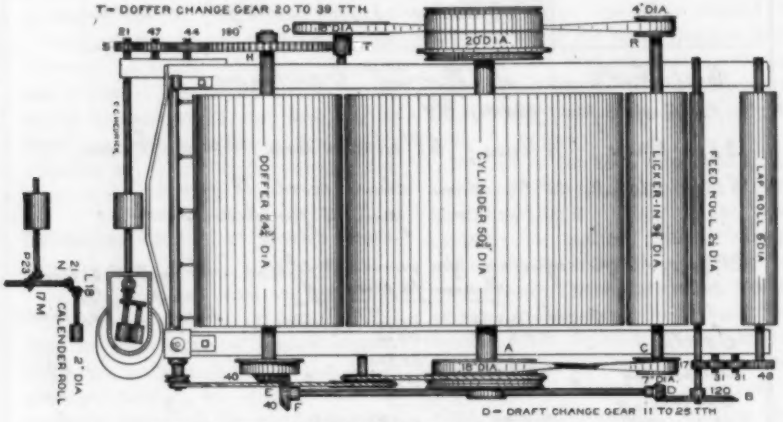


FIG. 88. THE SACO & PETTEE CARDING MACHINE.

Example: Speed of doffer 13 R. P. M.; inches delivered at each revolution 88.25; weight of sliver 60 grains per yard; time run per day 600 minutes (10 hours). (13 × 88.25 × 60 × 600) ÷ (7000 × 36) = 41,301,000 ÷ 252,000 = 163.89 pounds.

In this example, the time run per day is given as 600 minutes, or 10

hours, no allowance having been made for the time lost in stripping and cleaning, which under ordinary circumstances amounts to about 5 per cent.

Rule 2. To find the factor for the production of the card in 10 hours: Proceed as in rule 1, except omit the revolutions of the doffer and the weight of the sliver.

Example: (88.25 × 600) ÷ (7000 × 36) = 52,950 ÷ 252,000 = .21,011 factor.

Rule 3. To find the production by the factor: Multiply the factor by the revolutions of the doffer and the weight of the sliver.

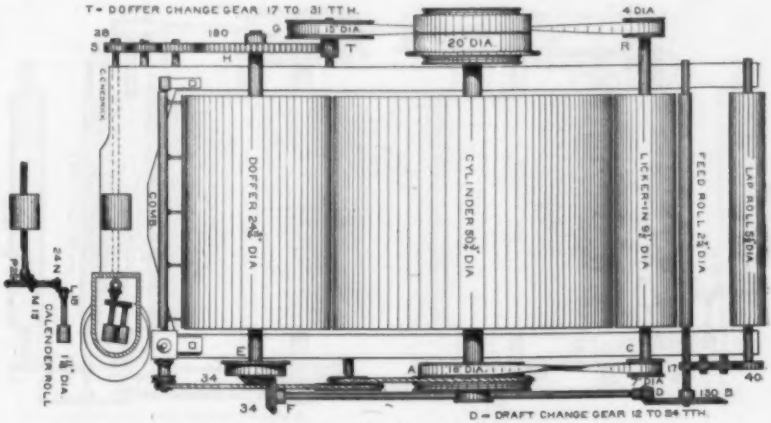


FIG. 89. THE MASON CARDING MACHINE.

Example: Speed of doffer 13 R. P. M.; weight of sliver 60 grains per yard. .21011 × 13 × 60 = 163.89 pounds.

Rule 4. To find the speed of the doffer: Multiply together the driving gears and the revolutions of the cylinder, and divide their product by the product of the driven gears multiplied together. The driving gears are D^1, Z, T (change gear) and V^1. The driven gears are B, S^1, P^1 and Q.

Example: Speed of cylinder 165 R. P. M.; doffer change gear (T) 30 teeth. (165 × 18 × 6 × 30 × 20) ÷ (7 × 12 × 40 × 192) = 10,692,000 ÷ 645,120 = 16.57 R. P. M.

Rule 5. To find the factor for the speed of the doffer: Proceed as in rule 4 but omit the doffer change gear.

Example: (165 × 18 × 6 × 20) ÷ (7 × 12 × 40 × 192) = 356,400 ÷ 645,120 = .552 factor.

Rule 6. To find the speed of the doffer: Multiply the factor by the number of teeth in the doffer change gear.

Example: Doffer change gear 30 teeth. .552 × 30 = 16.56 R. P. M.

Rule 7. To find the number of teeth in the doffer change gear that will give the required revolutions of the doffer: Divide the required revolutions by the factor.

Example: Speed of doffer required 16.56 R. P. M. 16.56 ÷ .552 = 30 teeth.

In rule 5, the factor for the speed of the doffer is figured with the cylinder at 165 R. P. M., but as the cylinder is often run at other speeds, it is convenient to have a factor which can be used with the cylinder at any speed.

Rule 8. To find the factor for the speed of the doffer with the cylinder at any speed: Multiply together the driven gears and divide their product by the product of the driving gears multiplied together, omitting the doffer change gear.

Example: (7 × 12 × 40 × 192) ÷ (18 × 6 × 20) = 645,120 ÷ 2160 = 298.66 factor.

Rule 9. To find the speed of the doffer: Multiply the revolutions of the cylinder by the number of teeth in the doffer change gear, and divide the product by the factor.

Example: Speed of cylinder 165 R. P. M.; doffer change gear 30 teeth. (165 × 30) ÷ 298.66 = 16.57 R. P. M.

Rule 10. To find the number of teeth in the doffer change gear, when the speed of the cylinder and doffer are given: Multiply the factor by the revolutions of the doffer and divide the product by the revolutions of the cylinder.

Example: Speed of cylinder 165 R. P. M.; speed of doffer 16.57 R. P. M. (298.66 × 16.57) ÷ 165 = 29.99 teeth.

Rule 11. To find the draft of the card, between the feed roll and the calender rolls in the coiler box: Multiply together the driving gears and the diameter of the coiler calender roll and divide their product by the product of the driven gears multiplied together with the diameter of the feed roll, omitting all intermediate gears. The driving gears are G^2, L^4, Q, Y^1, V and N. The driven gears are D (change gear 36 teeth), K^1, O, R^2, Q^1 and N^1. But as L^4 and K^1; V and Q^1, and N and N^1 are in pairs they may be omitted in the calculation.

In order to avoid fractions, the diameter of the feed roll, which is 2¼ inches, can be called 18 as there are 18/8 in 2¼ inches and the diameter of the coiler calender roll, which is 2⅛ inches, can be called 17.

Example: (120 × 192 × 31 × 17) ÷ (16 × 30 × 15 × 18) = 12,142,080 ÷ 129,600 = 93.68 draft.

Rule 12: To find the draft factor: Proceed as in rule 11, but omit the draft change gear.

Example: (120 × 192 × 31 × 17) ÷ (30 × 15 × 18) = 12,142,080 ÷ 8100 = 1499.02 factor.

Rule 13. To find the draft: Divide the factor by the number of teeth in the draft change gear.

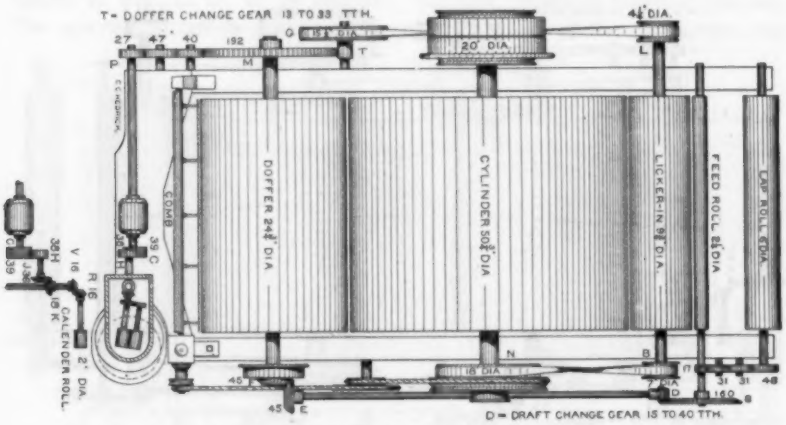


FIG. 90. THE WHITIN CARDING MACHINE.

Example: Draft change gear 16 teeth. 1499.02 ÷ 16 = 93.68 draft.

Rule 14. To find the number of teeth in the draft gear, when the draft is given: Divide the factor by the draft.

Example: Draft of card 93.68. 1499.02 ÷ 93.68 = 16 teeth.

Rule 15. To find the draft of the card necessary to make a sliver of a certain weight from a lap of a given weight: Multiply the weight of the picker lap in ounces per yard by 437.5 (the number of grains in one ounce) and divide the product by the weight of the sliver in grains per yard that it is desired to make.

Example: Picker lap 14 ounces per yard; weight of sliver to be made 60

grains per yard. (14 × 437.5) ÷ 60 = 102.08 draft.

In the foregoing rule, no allowance has been made for the loss in weight in carding, due to fly and strippings, which amounts on an average to about 5 per cent., which should be considered in figuring the draft.

Example: (14 × 437.5 × .95) ÷ 60 = 96.97 draft.

Rule 16. To find the length in feet of fillet necessary to cover a cylinder or doffer: Multiply together the length of the face of the doffer by its diameter and by 3.1416 and divide the product by the width of the fillet multiplied by 12 inches.

Factor for the speed of the doffer with the cylinder at 165 R. P. M.: The driving gears are A, R and T change gear. The driven gears are C, G and H. (165 × 18 × 4) ÷ (7 × 18 × 190) = 11,880 ÷ 23,940 = .4962 factor.

Figure 89. Draft factor: The driving gears are B, F, H, P and N. The driven gears are D (change gear) E, S, M and L. E and F are in pairs. The feed roll is 2 7/16 inches in diameter or 39/16 and the coiler calender roll 1 11/16 inches in diameter or 27/16. The diameters may be called 39 and 27 respectively. (130 × 190 × 29 × 24 × 27) ÷ (28 × 15 × 18 × 39)

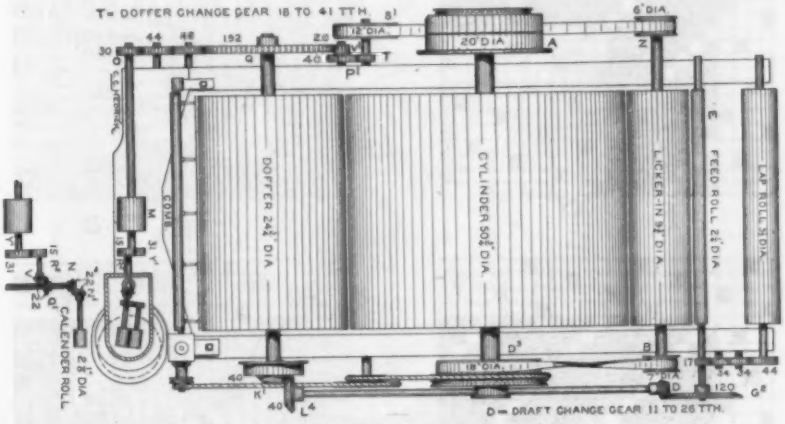


FIG. 91. THE LOWELL CARDING MACHINE.

Example: Doffer 41 inches face; diameter 24 inches; fillet 1½ inches wide. (41 × 24 × 3.1416) ÷ (1½ × 12) = 171.74 feet.

The following are the draft factors and factors for the speed of the doffer, for the cards shown in Figures 88, 89 and 90.

Figure 88. Draft factor: The driving gears are B, F, H, P and N. The driven gears are D (change gear), E, S, M and L. E and F are in pairs. The feed roll is 2¼ inches in diameter and the coiler calender roll 2 inches in diameter. Their diameters may be called 9 and 8 respectively. (120 × 190 × 23 × 21 × 8) ÷ (21 × 17 × 18 × 9) = 88,099,200 ÷ 57,834 = 1523.31 factor.

= 464,162,400 ÷ 294,840 = 1574.28 factor.

Factor for the speed of the doffer with the cylinder at 165 R. P. M.: The driving gears are A, R and T (change gear). The driven gears are C, G and H. (165 × 18 × 4) ÷ (7 × 15 × 190) = 11,880 ÷ 19,950 = .5954 factor.

Figure 90. Draft factor: The driving gears are S, E, M, C, J and V. The driven gears are D (change gear) F, P, H, K and R. E and F, and V and R are in pairs. The diameter of the feed roll and the coiler calender roll may be called 9 and 8 respectively. (160 × 192 × 39 × 36 × 8) ÷ (27 × 38 × 18 × 9) = 345,047,040 ÷ 166,212 = 2075.94 factor.

Factor for the speed of the doffer with the cylinder at 165 R. P. M. The driving gears are N, L and T (change gear). The driven gears are B, G and M. The diameter of L, which is 4¼ inches, can be called 17 and the diameter of G, which is 15½ inches, can be called 62. (165 × 18 × 17) ÷ (7 × 62 × 192) = 50,490 ÷ 83,328 = .6059 factor.

Types of Woven Fabrics.

THEIR CHARACTERISTIC FEATURES, CONSTRUCTION AND MANUFACTURE.

ARTICLE III.

HARRY NISBET.

(Copyright.)

Brocade Fabrics. (Continued): In addition to binding both the figure and

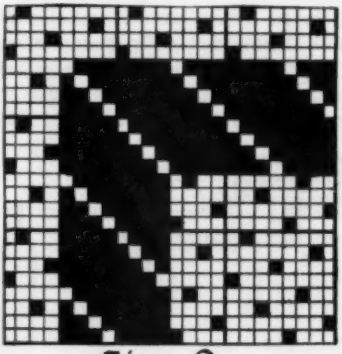


Fig. 9

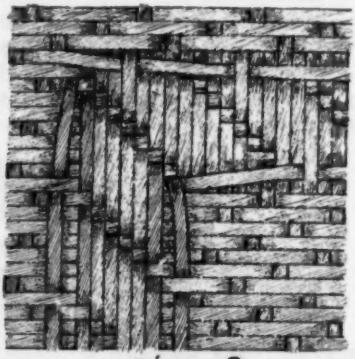


Fig. 9a

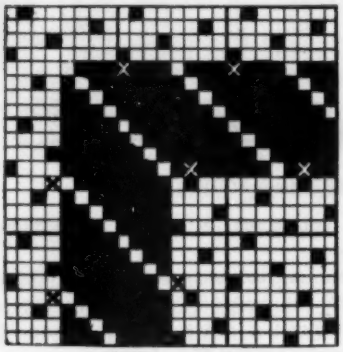


Fig. 10

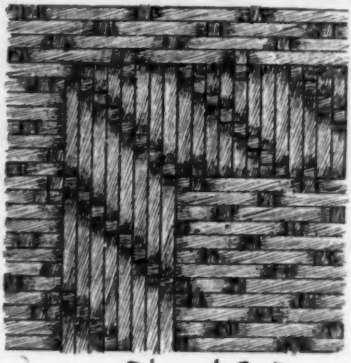


Fig. 10a

—The bleacher, the dyer and the calico printer are severally occupied in processes that are well or ill done, according as they do or do not conform to chemical laws.

—The education of man never ceases. As the great majority of men must be educated and trained to earn their daily bread, educated labor becomes a necessity to our well being.

ground portions of a brocade design for the purpose of preventing too long floats of warp and weft, it is essential to properly check all parts where warp and weft are contiguous, as when warp figure abuts against weft ground, or vice-versa, and when warp figure abuts against weft figure.

The object of checking is to prevent picks of weft from sliding into warp, where a weft margin lies horizontally

against a warp margin, and to prevent ends of warp from sliding into weft, where a warp margin lies vertically against a weft margin; otherwise, ends and picks would slide out of their proper place, and cause those places to have a ragged appearance, thereby spoiling the design. This tendency of threads to slide arises, so far as weft is affected, from a warp-end extending beyond its fellows and encroaching upon one or more picks which are thereby free to slide underneath the warp-end, and assume a wavy appearance. In like manner, ends slide into weft from a similar cause. To prevent this evil it is only necessary to bind down encroaching threads by putting extra binding points upon them where required. This will be better understood by reference to Figs. 9 to 10a. Fig 9 is a portion of a design with the margins of ground and figure unchecked. Fig. 9a illustrates the effect that would obtain in cloth. Ends from figure slide underneath encroaching picks, and picks from ground slide underneath encroaching ends, thereby imparting to the places affected a very straggling appearance. By the simple expedient of binding the design in the manner shown in Fig. 10, where additional binding points X are made, a much smarter appearance is imparted to the fabric by keeping all threads straight and in their proper place as seen in Fig. 10a. Of course, the employment of such additional binding points is in itself frequently an objectionable feature, as they sometimes impair the appearance of a design by over-binding; still, of the two evils, it is perhaps the least objectionable, and the safest one to adopt.

FIG. 11.

By exercising a little ingenuity in the selection and arrangement of binding weaves, a designer may frequently avoid the necessity of checking in many parts of a design, by causing the weaves of figure and ground to check

each other. This is more easily accomplished where the margins of figure and ground are perfectly horizontal and vertical as in designs of a geometrical character, than in designs of a foliated character where only short lengths of yarn are exposed at the margins. A good plan to adopt in binding a design, when weaves with single binding points that are all on the same "tab" are used, is to have the weave of the figure portion on the opposite "tab" to the weave of the ground portion; as, by this means, they will, in many places, accidentally check each other, and fewer additional binding points will be required. By referring to designs Fig. 8 (Art. II) many such places will be seen.

Brocade fabrics in which (a) extra warp ends, and (b) extra picks of weft are employed for figuring purposes.

Brocade fabrics may be rendered additionally attractive by the employment of extra warp-ends or of extra picks of weft, of a different color to the ordinary warp and weft. Such extra colored threads do not replace ordinary threads of the corresponding system, so as to form bands of color up or across the piece, but are wrought into the fabric as additional threads in such manner as is predetermined in the design. This extra material may either float loosely at the back of the fabric when not required on the face for figuring purposes, and be afterwards sheared off, or it may be interwoven with the ground portion of the fabric. In the latter event, however, care must be taken to select such ground weave as will enable the binding points to be properly obscured, so as to prevent them showing through on the face side of the cloth. It is obvious, therefore, that a ground weave of plain cloth would not answer to such requirements, in consequence of that weave exposing the threads on both sides of the cloth for the least possible interval, and thereby providing no cover for the binding points.

The conventional group of foliage, Fig. 11, is a good motif for a design in which either extra warp or extra weft may be effectively employed. The two bunches of berries could be developed with the extra material, and the remaining portions with the ordinary warp and weft. A neutral weave of some kind should be used for the ground filling, so as to display both warp and weft figure with equal effectiveness.

Extra warp figuring.—Extra warp-ends should be governed, by preference, by spare hooks in the same jacquard machine as governs the ordinary warp. By this method, only one set of pattern cards is necessary, and less attention is required of the weaver than when an extra machine and set of cards are employed.

Since extra warp-ends do not interlace with weft with anything like the same frequency as do the ordinary warp-ends, their contraction during weaving is considerably less than that of the latter. They should, therefore, be wound upon a separate warp beam, when their delivery can be properly regulated.

The development of a design for a brocade fabric in which extra warp-ends are employed, is little different from that of an ordinary design. The designer must know the number and disposition of extra warp-ends at his command, if he is making a design to an existing tie-up; but if he creates a new tie-up, he may dispose the extra warp-ends to suit his requirements, and have the jacquard harness tied up accordingly.

When preparing a design on point paper, the portions of figure to be developed with the extra warp-ends should be painted in a different color from that representing the ordinary warp. Also, if the extra ends are to be interwoven to prevent them floating loosely at the back, a third color should be used to indicate the binding points. Fig. 12 is a very simple example that will serve to demonstrate the development of such a design. It consists of two square pyramids arranged alternately upon a 4-end basket or matt-weave for ground filling. The

centre of each base is developed with the extra warp-ends (represented by shaded squares) to form a diamond. This is surrounded by a weft figure one of them into the fabric at the back.

The design repeats on 48 ends and 96 picks, with 22 extra warp-ends—11

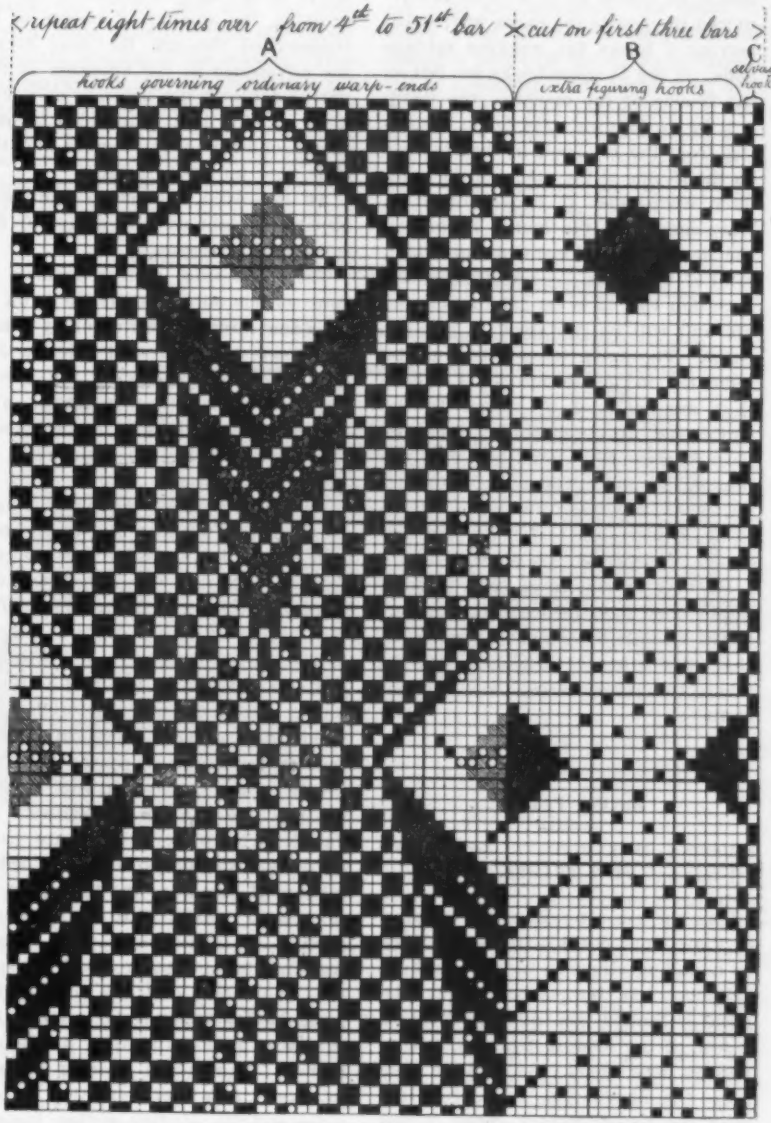


FIG. 12.

(represented by blank squares); and the sides of the pyramid are developed with the ordinary warp (represented by black squares). Round white dots indicate both warp-ends lifted to bind for each figure. Assuming the design to be woven by means of a 400s jacquard machine (408 hooks) with a straight-through tie-up on 384 hooks, the card-cutter would repeat the de-

sign eight times over on each pattern card, because $384 \div 48 = 8$. As there are 408 hooks in the machine, this would leave $408 - 384 = 24$ spare hooks, of which $11 \times 2 = 22$ are required to operate the extra warp-ends, leaving 2 hooks for working selvage ends. If the 24 spare hooks are left on the 26-side of the machine, the tie-up will be as follows: 384 hooks (counting from the 1st hook in the 51st bar on the 25-side of the machine) for ordinary warp-ends; 22 hooks for extra warp-ends; and the last 2 hooks (on the 26-side) for selvage ends; making a total of 408 hooks.

Design Fig. 12 is set out for this tie-up, and will be contained in it eight times. The extra warp-ends must be indicated in the design at A where they are required to appear in the cloth; and also (in another color of paint) where they must be lifted for binding purposes. Their order of lifting must then be transferred to the hooks B set apart for them. Selvage hooks C are working a plain weave.

Harness threads from extra figuring hooks must pass through the comberboard behind the ordinary harness so that their mails will fall exactly where the extra warp-ends will lie in cloth.

(To be continued.)

Roving Frames.

SLUBBING, INTERMEDIATE, ROVING AND FINE FRAMES.

The success attending the working of Platt Bros. & Co.'s frames justifies us in calling attention to them in these columns. As the space at our disposal is limited, we can only mention a few of the leading features in connection with them. As will be seen from the illustration, they are fitted with the patent duplex cones, which give regular and accurate driving to the bottom cones, and, consequently, to the winding motion, thus insuring great regularity and a perfectly wound bobbin. They also allow of narrow cone straps, which it is claimed, give a more accurate variation in speed than with the usual single wide cone strap. At the present time, when there is a growing tendency to adopt long machines, thus increasing the amount of power to be transmitted through the cone strap, the advantage in the adoption of the patent duplex cones becomes more evident. Again, if a cone strap breaks, the machine is kept running and the ends kept up by their use.

An improved cone strap tightening apparatus tightens both straps at the same time.

The differential motion consists of spur wheels only, and, as they run in the same direction as the pulley shaft, the wear and tear and friction are minimized, thus reducing the power required to drive the apparatus, and consequently increasing the efficiency of the motion and the durability of the various parts.

To reduce to a minimum the irregularity in the winding due to the motion of the lifting rail (in connection with the train of wheels between the winding motion and the bobbin shafts) the driving or pulley shaft is placed in the centre of the arc described by the swing lever in the motion from top to bottom of the chase or lift.

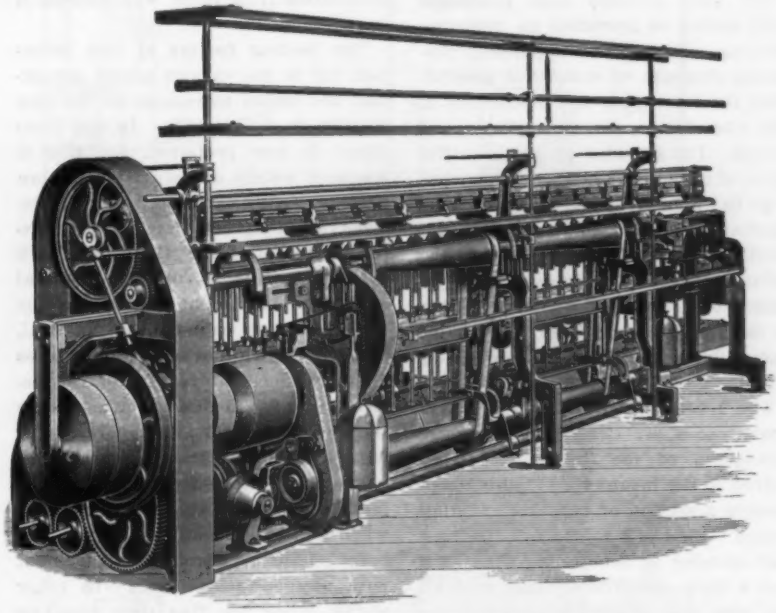
Only one wheel of large diameter is used in the swing lever, consequently the friction and wear in this part of the machine will be considerably reduced. The pulley shafts are case-hardened from end to end, the pedestals are of cast iron, and the whole arrangement works with a minimum amount of friction and wear. Solid cast iron bed plates are used between the frame end and the first spring piece, having fitting beds, to which the reversing motion and other details are bolted. Spur wheel gearing is used in every case between the bottom cones and the winding motion, instead of an upright shaft with bevel wheels, and in connection with this system of spur wheel gearing, there is a convenient arrangement for changing the wheels, if required, at any time. The whole is well guarded, though the

guards are shown removed in the illustration.

Automatic locking doors are provided at the back of the machine, between the frame end and the first spring piece, thus covering effectually the main gearing of the frames. This automatic locking apparatus is applied to prevent the frame being set in motion until the doors are closed and fastened, and, once closed, and the strap having been put on the fast pulley, the doors cannot be opened again

tons of metal being dispensed with in a moderate sized mill.

With the duplex traverse the pressure and draft and the wear of the top rolls are uniformly the same at every point of the traverse, thus insuring a perfectly drawn yarn, reducing to a minimum the rapid wear and the grooving and channeling of the top rollers, which cause crimped and broken fibre and roller licking and lapping, and relieving all the working parts of the machine.



until the strap is moved on to the loose pulley and the machine is stopped, thus preventing the liability to accident from oiling and cleaning the machinery in motion. This apparatus adds greatly to the rigidity and firmness of the frames, minimizing the vibration caused by the train of wheels driving the top cones, lessening the wear and tear of wheels, brackets and shafts, and reducing the risk of breakage to a minimum.

Platt's also supply patent duplex traverse bars, which produce a very even and superior yarn, with a third less weighting on the rollers, many

We understand that the demand for these frames has been so great that Messrs. Platt Bros. & Co. have recently been obliged to considerably extend this department of their works.

Not only have Platt's frames been supplied to more than half the mills in the Oldham district, where there are over 13,000,000 spindles, but, from a list we have before us, a very large number of the leading fine spinning mills in Bolton and district have put in these frames in recent years along with Platt's other machinery.

A glance at the share lists giving the market value of the shares and divi-

dends paid by mills fitted with Platt's machinery will be instructive.

Mr. E. A. Leigh, of Boston, Platt's sole representative in this country, informs us that he has sold several hundreds of these frames during the last five years, and in every case they are giving the greatest satisfaction.

A Great Invention.

SPINNING IN THE AIR.

We have recently been privileged with seeing in operation an invention for ring spinning, that apparently possesses elements of wonderful possibilities for increasing the production of the ring frame for the spinning of cotton. The inventor of this beautiful piece of mechanism is Victor Belanger, who has exhibited in this device a remarkable mechanical ingenuity, yet without any practical experience in the spinning of cotton. It is another instance of a highly valuable invention in the textile industry, of one totally unfamiliar with the routine practice of a mill.

The accompanying illustrations will convey to a practical spinner a clear conception of the salient points involved in the invention. Figure 1 represents a section of the ring spinning frame. Figure 2 represents the ring and traveler in operation. Figures 3 and 4 show enlarged sections through the ring and casing, illustrating the positions assumed by the ring when at rest and in operation, respectively. We also illustrate the peculiar form of the traveler.

How far this invention will prove a practical success in ordinary mill operations, there is no substantial evidence to show, beyond what may be seen and conceived of in the mechanical laboratory, where it is certainly being operated with wonderful precision, that is almost convincing that a remarkable stride in spinning has been invented. We are loath to express an opinion as to what the device can do attached to a room full of spinning frames operated by ordinary help, such as is usually put upon such work. There are many factors to be considered which are difficult to take account of in an experimental shop. Undoubtedly certain perfecting mechanism will have to be introduced, as will be suggested when the device is put under practical conditions such as are found in ordinary mill usage. This has been the history of all inventions, both great and small, and it is not likely that this will prove an exception; still, as an invention, it excites admiration from those who witness it in operation.

The leading feature of this invention lies in the various means permitting the radial movement of the ring relative to the spindle. In the form which is now preferred, the ring is mounted within a casing,—on a fibre cushion resting on the rail,—as will be observed in figures 3 and 4, for limiting the movements of the ring in such manner that it is capable of radial and axial movement relative to the casing. It may be noted that its axial, or up and down movement, constitutes another important feature of the device. It is found that in operation the ring is raised from its support by the tension of the yarn, and rotates with infrequent contact with the casing. In fact, it would seem that the ring, when rotated, is to all intents and purposes nominally free from engagement with any enclosing walls. In other words, when the ring rises from its support, as seen in figure 4, it seemingly, if not actually, rotates in the air, an air cushion being formed between the ring and the casing. The revolution of the ring is effected by the very slight friction of the traveler upon its inner rim, the point of contact with the traveler being at the bend of the latter, which will be noted in the illustration.

Notwithstanding the great speed of the traveler, and also of the ring, there is no susceptible amount of heat generated, even after long continuous operation. For the one hour's time that we saw the spindles running at a speed of 12,000 and 16,000 to

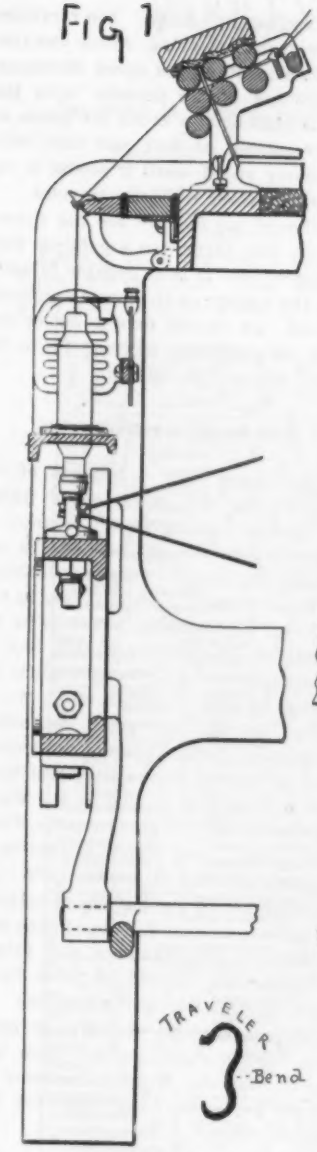


FIG 1
TRAVELER
Bend

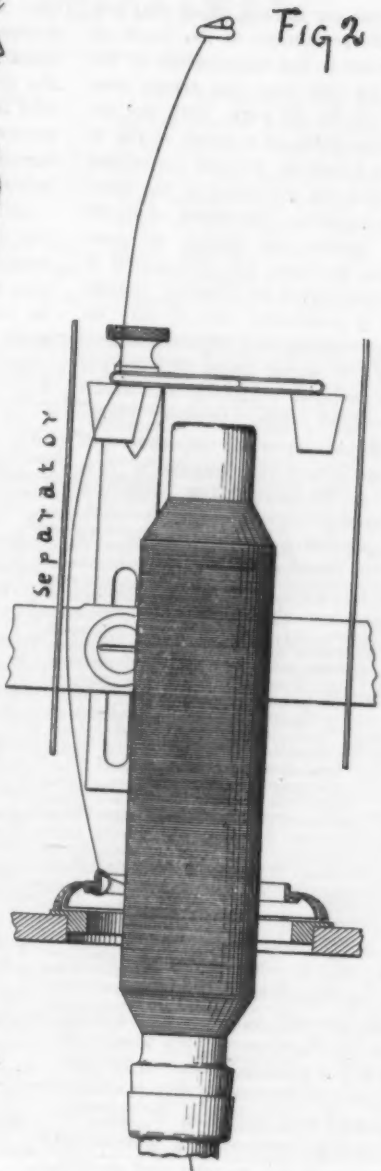


FIG 2
Separatoy

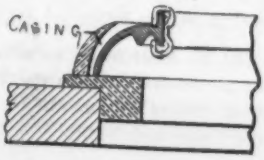


FIG. 3
CASING

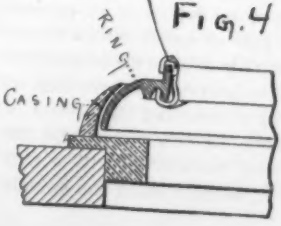


FIG. 4
RING
CASING

25,000 turns per minute, there was not the slightest evidence to the touch of any increase in the temperature of the metal. At this time the frame was running on No. 28 yarn, with the delivery rolls going at a speed of 185 to 225 turns a minute, without disturbing in the least the efficiency of the spinning movements. The speed of 25,000 turns a minute was simply to show what can be done, but this speed is not recommended at present, though there is a possibility that it may be advised in the future. With a speed, however, of 16,000 turns per minute for the spindle, which is the speed recommended under existing conditions, there is as much smoothness of action as when the spindle is running at 12,000 turns. The ballooning is no greater than is observed on ordinary spinning frames, when the spindle is going at a velocity of 10,000 turns. The yarn even does not touch the separator with the bobbin two-thirds full, being the condition under which we saw it run. Fig 2 gives a good idea of the amount of ballooning given to the yarn when the spindle is running at an extreme speed. We may say that the calculated speed of the delivery rolls on No. 28 yarn, with the spindle at ordinary speed, is 120 revolutions.

Up to the present time, the production of ring spinning machines has been limited by the inability of the drag, or traveler, to revolve in practical operation, more than a certain speed (say 10,000 turns a minute), without the traveler being heated, caused by its friction against the ring. To obviate this difficulty is one of the valuable points of this invention. It accomplishes the reduction of the friction, thereby permitting a more rapid revolution of the traveler and permits the spindle to be driven at an exceedingly high rate of speed, which recent improvements in it have made possible.

In order to prevent the breakage of the yarn, in overcoming the inertia of the ring when starting the spindle, the ring has been constructed with a race to receive it, so that when the spindle first begins to rotate, the traveler moves around the ring, which remains quiescent; but, as the speed increases, the friction of the traveler with the ring is sufficient to cause the latter to revolve slowly at first, and then with increasing speed, until it seems to revolve in unison with the traveler.

Although we did not see the invention on fine yarns, we are fairly well convinced that it is as capable of spinning the higher, as the lower numbers. In fact, we should expect better results, if anything, on No. 40 to 50 yarns, than on No. 28.

Weft-Supplying Mechanism.

There have been a number of inventions for the supplying of filling to looms, automatically, many of which will never get beyond the experimental room. The practicability of these devices for mill use, in the majority of instances, is yet to be determined. In alluding to this fact, in an article on this subject that appeared in our December issue, we, of course, did not, and could not, allude to the beautifully adjusted mechanism that is applied to the Northrop loom, which is so well known as the manufacture of the Draper Company, Hopedale, Mass., and which is coming so rapidly into use in cotton mills. The weft-supplying mechanism as attached to the Northrop loom is one of the most wonderful inventions of the present century. Over 30,000 of these looms, with automatic weft-supplying and other mechanism, are now in operation, and the demand for them is so great that the Draper Company are about to double their plant for their manufacture.

—Given the certainty that most of us must work with our hands, obviously a trade is best learned by apprenticeship in the technical school.

—It will be interesting to note the effect of the present war in the Transvaal upon future shipments of wool from the Cape and Natal.

WOOLEN DEPARTMENT.

Ingenuity in Modern Textiles.

CHARLES E. WILES.

ARTICLE IX.

(Copyright.)

Passing from the single make textures, we encounter those which depend upon an extra series of picks, or threads, or both. An example of the first class, viz., double in the weft is given sectionally at Figure 3, the detailed construction of which is explained as follows:

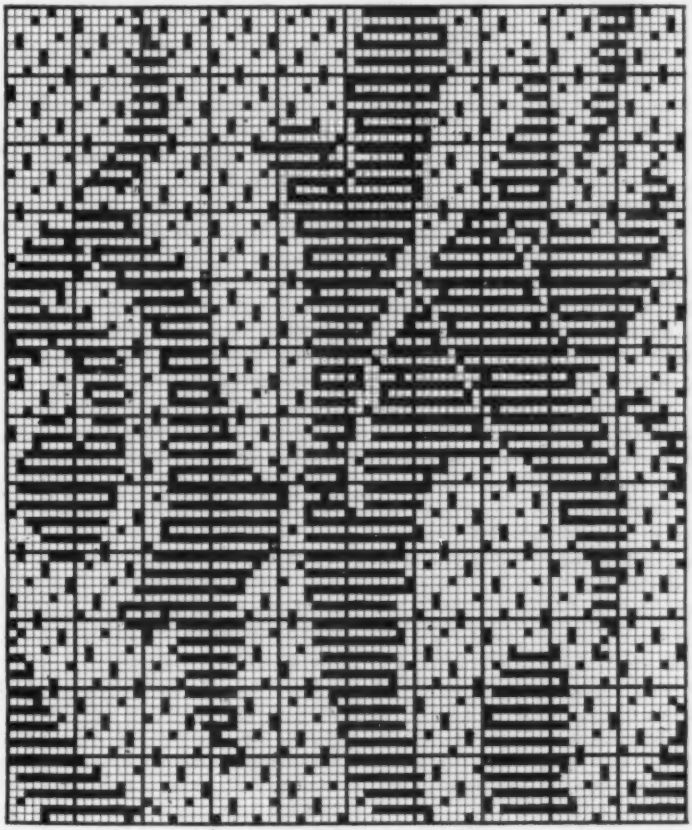


FIG. 3.

Warp ways the fabric is composed of 2/60s worsted yarns, set with about 72 ends to the inch, the picks being inserted, one of 2/60s cotton and one of 2/24s mohair. The mohair is flushed to form the figuring, and when not thus employed it retires to the under side of the fabric, stitching in ten shaft sateen order, with the warp. For the ground cloth the worsted warp weaves five shaft sateen with the cotton weft, and the comparatively large number of picks got into the fabric (48 of cotton and 48 of mohair, per inch) serve to throw the figuring well into relief. Another factor which contributes towards this consists in allowing all the warp to lie loosely between

the two wefts where actual figuring occurs, as shown in the plan, and in designs where large figuring details are introduced it is usual to let the picks work plain for a short distance round the figure and so prevent any looseness.

Another style of pattern, double in the weft, with a single warp, is indicated in Plan 4. In order to thoroughly comprehend its structure the reader should make occasional reference to the sketch whilst studying the remarks appertaining thereto. The warp of the texture is composed of 2/48s worsted yarn of an olive green shade with 86 ends per inch, wefted one pick of 2/24s mohair, black (marked in solid squares), and one pick of 2/40s worsted, russet brown shade. A double outline to the figuring is obtained by floating the mohair picks alternately, the other series of picks weaving four and one sateen with the warp which is here covered owing to the thickness of the mohair. In the top left hand and also the bottom right hand corners of the plan an almost solid green effect is produced, due to the warp, which again weaves in five-shaft satin order with the brown weft. In this instance, however, the mohair is out of sight, only being stitched once in every ten threads to the ground cloth in such places as will most effectually hide all trace of the tie. Then a third effect, traceable in the central portion of the plan is visible, giving a surface cloth brown in color. This is, of course, due to the weft satin make employed for the brown picks, which, to a large extent, obliterate the stitchings of the mohair to the warp, the five shaft warp sateen crossing being again employed for this purpose.

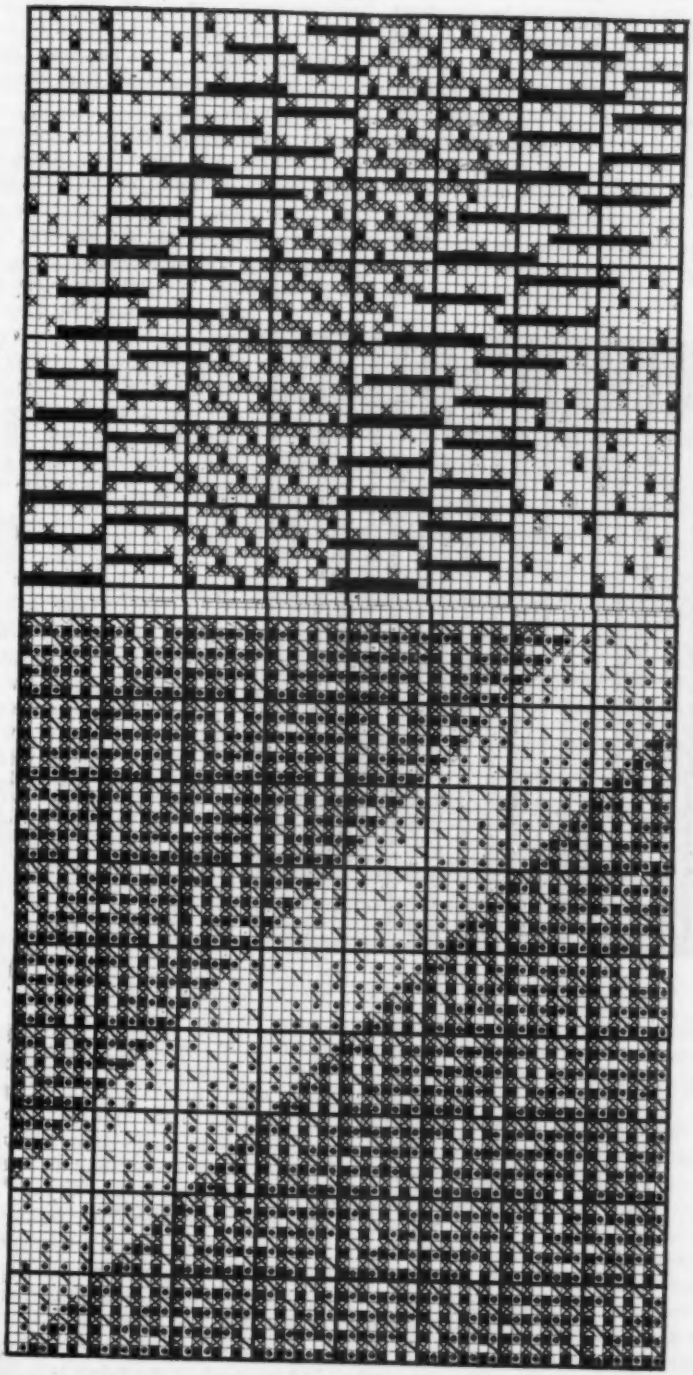
It will thus be understood that by varying the orders of the colors, employing only those which will, when mingled, produce a harmonious whole, it becomes possible to obtain an interesting assortment of effects from the same plan, and a multitude of patterns from a single range.

The yarns which are intended for use in such styles should also be made the subject of study, insomuch as perfect proportion must be obtained between the sizes of the various series employed, if the maximum of effect is to be arrived at. Where a certain series of picks are required to cover others which come between them, nothing short of actual experiment will enable the designer to arrive at the correct counts of yarns suitable for the purpose. A thread too small or too large, be it ever so little, will often mar what might otherwise have been a successful production.

Plan 5 is of a fabric double in both warp and weft, and was suggested by a most interesting texture intended for wear as opera cloaks and the like. The two warps are arranged thread and thread, one of cotton and one of silk, alternately; and the weft, one pick of a thick, soft woolen yarn or roving (about 2 drams for 40 yards), pink in shade, and one pick of white cotton. In the darker parts of the plan the thick weft (picks 1, 3, 5, etc.), covers all the silk, and floats over six of the cotton ends and under two, in twill order. The even picks of cotton work plain with similar threads in the warp, floating under every eighth silk thread to bind the latter into the texture. These stitching places also follow one another on alternate picks in a straight twill. Thus the surface aspect of the pattern here is a marked twill due to the soft thick roving yarn being depressed two in every eight by the cotton threads.

Figuring is developed upon this ground by means of the silk warp yarns, the method of accomplishing this being indicated by the light section in the plan. Here the cotton threads and picks still weave plain, but all the silk ends are flushed over both cotton and woolen picks, and, being of a substantial thickness and contrasting color, they show up very effectively upon the woolen ground. In order to make the most of this style of fabric construction the figure element should be bold in character and devoid of any minute detail, which latter can-

PLAN 4.



PLAN 5.

not of course be satisfactorily reproduced. The warp should be set about eighty threads in the inch and shot with sixty-four picks.

Some of the more elaborate and expensive types of mantle cloths are constructed on the matelasse principle. As brief reference has, however, been already accorded to this make of texture in the article on vesting cloths, it will not be necessary to give more than one example in this section.

This has been furnished by a very

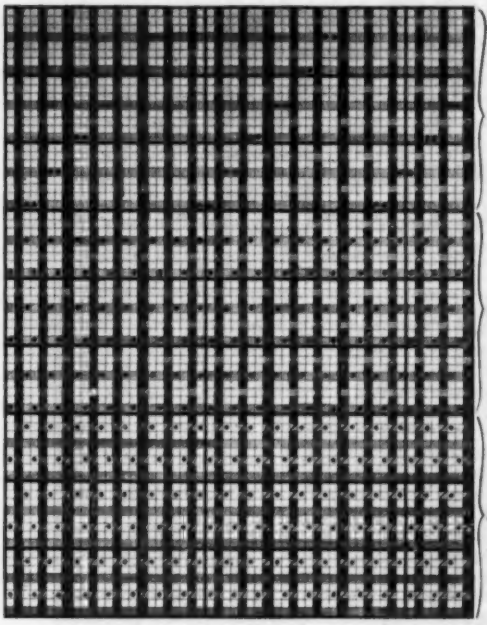


FIG. 6.

handsome silk fabric, ornamented with a bold all-over design developed in black yarns, the ground being of a deep crimson shade, which exhibits the decorative detail to perfection. Wadding picks are also introduced for the double purpose of imparting that characteristic fulness and relief to the pattern and adding weight. Owing to the large size of the pattern, which requires six hundred threads of warp to one repeat, it is impossible to present here a full plan of the same, but the three most important effects in the fabric are reproduced in the sectional plan shown at Figure 6. The warp arrangement consists of two threads of face yarn (silk) to one of cotton for backing all black. This has been indicated by darkening every third thread in the sketch.

The picks are inserted as follows: One (which may be either cotton or silk) shown darkened in the plan; one of thick yarn for wadding; one of crimson silk to form the ground; one of thick yarn for wadding.

Bearing this in mind, the construction as shown in Plan 6 may readily be understood. For instance, in Section A, the scheme of interlacing for the ground portion of the design is shown. Here the crimson picks are weaving a plain structure in conjunction with the face warp threads, covering of course, the other series of thread entirely. At the same time, these backing threads are showing weaving plain with the black picks, whilst between the upper and lower structures the wadding yarns are lying loosely, being held in their proper places more or less securely by the constant changing of position from face to back, etc. of the other picks and threads in different portions of the design. This alteration of position is also entirely responsible for the binding of the face and back cloths, which would otherwise fall apart as they are in no way specially stitched together. Were this to be done, either in the ground or figured sections, the raised appearance of the pattern would be to some extent destroyed, as it would tend to pull the upper and lower textures into close proximity with each other throughout.

Section B. of Plan 6, illustrates the method which has been employed to produce the body of the figuring. In this portion the black picks are making a plain cloth with the face threads, and the back of the fabric is composed

of the crimson weft with the backing warp, also working plain.

The third effect is utilized as an outline for the figures and is produced (see section c) by flushing the face warp over a considerable number of picks; a too great length of float being prevented by bringing a cotton pick over, as indicated by dots in this section. In those places where the cotton is not thus employed, it is working along with the wadding between the face and back, the latter being due to a series of plain interlacings of the backing warp with crimson weft. Many other styles of weave effect are possible with this make of texture, and once the principles underlying its structure are thoroughly grasped, the production of other interesting fabrics of the same class becomes more a matter of time and patience than of actual technical skill. The number of threads and picks per inch in the mantling just described is 120 and 160 respectively.

Construction of Box Chains.

G. WASHINGTON.

(Concluded from December.)

With three boxes at each end any three shuttle patterns can be woven, each shuttle has a spare box and is therefore free to move at any time irrespective of the position of the remaining shuttles.

When four shuttles are employed, there are two spare boxes which allow considerable latitude in making the chain. Care must be taken never to have the required shuttle alone at one end, and the other three shuttles in the boxes at the opposite side of the loom. If this occurs when making a chain, begin again with one of the empty boxes at the other end, or change the position of two of the shuttles, so as to get a fresh combination which may possibly accomplish what is required without coming to a dead lock.

For example a chain is required to weave

4 black
2 gray
9 black
2 white
9 black
2 gray
4 black
2 blue

The shuttles are allocated to the following boxes:

black 1 L
gray 1 R
white 3 L
blue 3 R

leaving the centre boxes empty at each end, so that there may be fewer double lifts than if the two bottom boxes were vacant.

1 L to 2 R, 2 R to 1 L } 4 black
1 R to 2 L, 2 L to 1 R } gray
1 L to 2 R, 2 R to 1 L, 1 L to 2 R } 9 black

At this point the position of the shuttles is

gray 1 R
black 2 R
blue 3 R
white 3 L

therefore as white should pick next, is on the left side of the loom, and the three boxes on the right side are all occupied, a new start is required with the shuttles in different boxes.

Chain 12 shows the result of moving the black shuttle from 1L to 2R thus bringing both empty boxes to the left side of the loom.

The effect of changing the position of two of the shuttles, say the blue and white, is shown in chain 13, the empty boxes remaining one on each side.

12		13	
2 R to 1 L, 1 L to 2 R	4 black	1 L to 2 R, 2 R to 1 L	4 black
1 R to 1 L, 1 L to 1 R	2 gray	1 R to 2 L, 2 L to 1 R	2 gray
2 R to 1 L, 1 L to 2 R, 2 R to 1 L	9 black	1 L to 2 R, 2 R to 1 L, 1 L to 2 R	9 black
3 L to 2 R, 2 R to 3L	2 white	3 R to 2 L, 2 L to 3 R	2 white
1 L to 2 R, 2 R to 1 L, 1 L to 2 R	9 black	2 R to 1 L, 1 L to 2 R, 2 R to 1 L	9 black
1 R to 1 L, 1 L to 1 R	2 gray	1 R to 2 L, 2 L to 1 R	2 gray
2 R to 1 L, 1 L to 2 R	4 black	1 L to 2 R, 2 R to 1 L	4 black
3 R to 1 L, 1 L to 3 R	2 blue	3 L to 2 R, 2 R to 3 L	2 blue

With 5 shuttles and 6 boxes, the loom must pick from each end alternately; only one box is empty, therefore only two of the shuttles in addition to the one in use are available for any particular pick. Patterns in 5

colors with even picks from each shuttle can not be woven, because an odd pick is required before the spare boxes at the other end of the loom can be used. Each shuttle must stand idle for an even number of picks, before it can be brought into action again: for instance a pattern

12 black
1 brown
4 black
1 blue
4 black
1 brown
12 black
1 light gray
4 black
1 scarlet
4 black
1 light gray

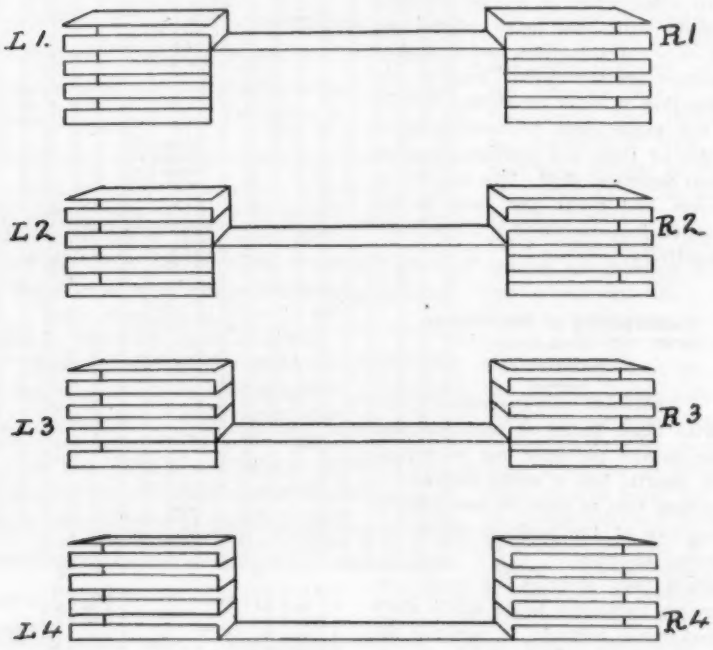
could not be woven because an odd number of picks is required between the various black picks. Therefore, if the black shuttle is idle in one of the boxes at the right hand side of the loom, one or any other odd number of picks will fill all the boxes at the opposite end, and the spare box will not be available for the black shuttle. The same difficulty occurs with each of the other four shuttles.

This difficulty can be overcome by altering the pattern.

12 black
2 brown
4 black
2 blue
4 black
2 brown
12 black
2 light gray
4 black
2 scarlet
4 black
2 light gray

But now, as there are no odd picks in the pattern, the shuttle changes can only be made at one end of the loom. Therefore, two of the five shuttles can not be used, and the amended pattern also cannot be woven in this loom.

Chain 14 is for a pattern



13 black
2 brown
4 black
2 blue
4 black
2 brown
13 black
2 light gray
4 black
2 scarlet
4 black
2 light gray

which not only allows each shuttle to stand idle for an even number of picks but also contains a few odd picks that allow the shuttles at the other end of the loom to come into action when required.

14

2 R to 2 L, 2 L to 2 R, 2 R to 2 L } 13 black
1 L to 2 R, 2 R to 1 L } 2 brown
2 L to 2 R, 2 R to 2 L } 4 black
3 L to 2 R, 2 R to 3 L } 2 blue
2 L to 2 R, 2 R to 2 L } 4 black
1 L to 2 R, 2 R to 1 L } 2 brown
2 L to 2 R, 2 R to 2 L, 2 L to 2 R } 13 black
1 R to 2 L, 2 L to 1 R } 2 light gray
2 R to 2 L, 2 L to 2 R } 4 black
3 R to 2 L, 2 L to 3 R } 2 scarlet
2 R to 2 L, 2 L to 2 R } 4 black
1 R to 2 L, 2 L to 1 R } 2 light gray

If a pattern does not comply with these two necessary conditions it is a waste of time attempting to make a chain for it.

The allocation of the shuttles to the various boxes is important, and is the cause of many a dead lock in pattern construction. When an even number of picks are required consecutively, the shuttles must all be at one side of the loom; and every odd pick alters the end of the loom at which the change can be made.

The advantages of having 4 boxes at each end are that any 4-shuttle patterns can be woven. Patterns that require an even number of picks from 5 or 6 shuttles can be woven by leaving at least one spare box at each end. Also, as there are two or three spare boxes available, a good many possible combinations of odd or even picks can be woven by a proper allocation of the shuttles to the various boxes.

Chain 15 is for the pattern that could not be woven in a three-box loom, commencing 12 black and 2 brown.

15

2 R to 2 L, 2 L to 2 R } 12 black
1 R to 2 L, 2 L to 1 R } 2 brown
2 R to 2 L, 2 L to 2 R } 4 black
4 R to 2 L, 2 L to 4 R } 2 blue
2 R to 2 L, 2 L to 2 R } 4 black
1 R to 2 L, 2 L to 1 R } 2 brown
2 R to 2 L, 2 L to 2 R } 12 black
1 L to 3 R, 3 R to 1 L } 2 light gray
2 R to 2 L, 2 L to 2 R } 4 black
3 L to 3 R, 3 R to 3 L } 2 scarlet
2 R to 2 L, 2 L to 2 R } 4 black
1 L to 3 R, 3 R to 1 L } 2 light gray

The 5-color pattern commencing 12 black, 1 brown, cannot be woven even in a 4-box loom.

Patterns requiring 7 shuttles are subject to similar limitations, as 5 shuttles in 6 boxes, excepting that there is always three boxes available when making a change.

Large check patterns and overchecks, require long box chains, especially if there is an odd number of picks from any of the shuttles in one repeat of the pattern; when this occurs it doubles the length of chain required in order to bring each shuttle back to its original position.

When the number of colors in a pattern are nearly equal to the number of boxes in the loom, it is often difficult or impossible to make a chain for it. Frequently a slight modification in the order of picking, which will hardly make any perceptible difference to the appearance of the fabric, will render the chain quite easy to make.

A little consideration on the part of the designer, to keep the pattern within the limits imposed by the number of boxes in the loom, and also to have an even number of picks from each shuttle, will save a considerable amount of time and trouble afterwards.

A fabric contains

71 picks black
1 pick black and crimson silk twist
71 picks black
1 pick black and light blue silk twist

144

But as only one pick is taken from each of the bobbins of twist, the pattern chain will be 288 picks long.

The face pattern of a double cloth is as follows:

7 { 1 blue, 1 black and lavender twist, 1 black }
16 { 2 black, 2 twist }
16 { 1 black, 1 twist }
64 { 2 black, 2 twist }
16 { 1 black, 1 twist }

16 { 2 black, 2 twist
8 { 1 black, 1 twist
144

There is a backing pick between each pair of face picks, or 216 picks in one repeat of the pattern. The blue used for overchecking is very dull, and scarcely shows, yet it entails a box chain 432 picks in length.

Chain 16 shows that without the blue overchecking pick, this pattern can be woven with 2 boxes at each end, the shuttles following each other around the boxes. No. 1 shuttle contains black and is placed in 1R; No. 2 shuttle twist weft in 2L; No. 3 shuttle backing weft in 2R.

16

A { 1 R to 1 L, No. 1 shuttle
2 L to 1 R, " 2 "
2 R to 2 L, " 3 "
1 L to 2 R, " 1 "
1 R to 1 L, " 2 "
2 L to 1 R, " 3 "
2 R to 2 L, " 1 "
1 L to 2 R, " 2 "
1 R to 1 L, " 3 "
2 L to 1 R, " 1 "
2 R to 2 L, " 2 "
1 L to 2 R, " 3 "

B 4 times { 1 R to 1 L, " 1 "
1 L to 1 R, " 1 "
2 R to 1 L, " 3 "
2 L to 2 R, " 2 "
2 R to 2 L, " 2 "
1 L to 2 R, " 3 "

Repeat A twice.
" B 16 times.
" A twice.
" B 4 times.
" A.

If the backing pick was placed so that it came between the two black picks, then three boxes at either side would be required to weave it. The one pick of blue acts in the same manner causing the black shuttle to be at the wrong end of the loom when it is required to take its next turn, and an extra box at each end is necessary on that account, in addition to the box for the blue shuttle; so that 4 boxes at each end of the loom, and double the length of chain are required to insert a single overchecking pick in this pattern.

A check pattern is picked in the following manner:

28 { 4 white
4 blue
3 blue
1 crimson
4 white
4 blue
4 white
3 blue
1 crimson
24 { 4 white
4 blue
80 { 2 white
2 blue

The two picks of crimson, and the two threes of blue, return the shuttles back to the starting point. This pattern requires three boxes at each end, the 1 crimson and 4 white; or an odd number of picks between the blue ones, prevents it from being woven on a two-box loom. Without the crimson only 2 boxes at one end of the loom would be required.

An 8-shaft twill fabric is made as under:

Warp	Weft
2 lavender	2 light drab
3 black	2 brown
	1 dark drab
2 lavender	2 white
1 dark gray	1 dark drab
2 black	2 brown
2 lavender	2 light drab
4 white	4 white
96 { 2 lavender	96 { 2 light drab
3 black	3 brown
2 lavender	2 light drab
3 white	3 white
3 dark gray	3 dark drab
3 white	3 white

This slight alteration of one pick makes it possible to use a chain of half the length. Box chains for long patterns take a long time to construct and several methods of reducing the length of chain, and thus saving time and labor, are in use for certain classes of fabrics.

One of the simplest is to make the box chain remain stationary for a certain number of picks each time. Thus a pattern

64 { 4 dark
4 light
64 { 8 dark
8 light

could be woven with a box chain of 32 links, if only turned over once every 4 picks.

Another device is to have two chains one consisting of only a single link in width, and, therefore, easily and quickly altered, to count the picks, and turn round the box chain whenever the boxes required altering. This reduces the length of the chain from the number of picks to the number of changes of color in the pattern.

With both these devices, as the box chain is only turned over at intervals, it cannot control the picking, and they

are only suitable for weaving patterns that admit of picking from each end of the loom alternately.

Another method which is very suitable for bordered fabrics, or patterns having the same order of picking repeated several times and then a change, is to employ a supplementary reversing chain. The box chain moves for every pick, and means are provided to cause it to turn the reversing chain, when it arrives at a particular pick in the chain. The reversing chain consists of two kinds of links, one to make the box chain go forward, and the other to turn it in the opposite direction.

When the box chain has arrived at the end of one repeat of the pattern and moved the reversing chain, if the link on the supplementary chain is different from the last, it reverses the motion of the box chain, and causes it to repeat that pattern once more. When two of the same kind of links come together in the reversing chain, then the box chain passes forward to the next pattern. This makes a great saving in work for which it is suitable, each single link in the reversing chain means a repeat of one portion of the box chain. Patterns to cover a whole handkerchief or similar article can be quickly made.

Moisture Regain in Wool.

Scoured and absolute dried wool at a temperature of 216° F. (=102.2° C.), when exposed to atmosphere either in the mill or the warehouse, regains a certain amount of moisture. Such specific regains have been fixed and are known on the Continent as official standard of regain, or official allowances for moisture.

And there is no more honest dealing than by applying official standards of regain in the buying and selling of wool.

Naturally each country has its own standard regain, and these standards are established by way of experiments ranging over twelve months, and the average for the twelve months is adopted for the standard per cent. of regain. Thus England has a standard of regain for different classes of wool, as follows:

For tops combed without oil, standard regain, 18.25 per cent.

For tops combed with oil, standard regain, 19 per cent.

Worsted yarn, 18.25 per cent.

Noils, 14 per cent.

Wools generally, 16 per cent.

But the extended experiments and tests of Dr. Fahrig, of the Philadelphia Commercial Museum, have proven that for this country 19 per cent. on oiled and 18.25 on plain tops is too high a standard regain. The average moisture regain for this country is 16 per cent. for oiled and 15 per cent. for plain tops.

—The weaving of any kind of cloth, whether woolen or linen or cotton, was absolutely prohibited by the Dutch in America, in Colonial days, as the market for the products of the looms in Holland were not to be curtailed.

—As had been forecasted at the close of 1898, the scarcity of merino wools in the world, owing to the continuous severe droughts, coupled with the fashion for fine-haired goods, contributed to a demand for merinos and fine cross-breds which has continued right through the last twelve months, with a very occasional pause for breath, resulting in an appreciation for these descriptions of from 60 to 65 per cent. over the rates current at this period last year; London prices having been reached which beat all previous records since the year 1872.

—The London closing sales of wool of last year marked quite an epoch in high values, but it must not be overlooked that the new clip which was then being sold surpasses in quality, cleanness and condition that of the previous year, though, in many cases, it is not so strong in staple, due, no doubt, to an exceptionally dry season.

KNITTING DEPARTMENT.

The Knit Goods Situation.

Everything in the knit goods realm is now so buoyant that more or less reaction may soon be expected. Not for years has such confidence been manifested. Jobbers generally now have as many orders on hand as they can ordinarily boast by April. Many seasons have passed since they were so busy.

Shrewd buyers will not be slow to take advantage of any decidedly soft spots in quotations, for the advance started from so low a basis that it is not likely to be realized again before another period of depression.

Every factory wheel is in motion, which means that supply will overtake demand within a few weeks.

Already the arbitrary demands of spinners have set certain manufacturers to spinning their own yarn, a course not as impracticable as may be thought at first sight, for most of the factories require only a few numbers. Much hinges on the course of yarn, which is unduly high, in spite of the firm position of raw materials and the general enhancement of values. Cotton spinners are determined. They will probably combine, but production is bound to undermine their plans eventually. Still, an effective association can prolong the struggle several months. At the present flow of investment funds into spinning, overproduction is within hailing distance.

Opinion among the trade was divided, at the opening of the new year, as to prices in the near future, many being averse to raising prices until the situation had further strengthened. Now, however, the crowd, along with the Knit Underwear Association and other organizations, is confidently talking higher prices, and all sorts of advances are being scheduled.

The slackening of business between Christmas and New Year's was hardly sufficient to have been called a lull.

Little new is shown in styles; the fact is the trade is too busy to give much thought to novelty of design.

Woolen and worsted underwear of leading grades are nearly if not quite sold up. Certain lines of knit underwear form an exception to the general forwardness of orders, owing largely to the striking advances in Australian and other wools.

Knit goods sundries such as leggins, shoulder wraps, etc., are in more active request than for seven or eight years, consequently the demand exceeds the supply.

Low grade goods in mixed wool are still suffering from cotton fleeced goods and the end thereof is not yet. Should cotton fleeces go much higher mixed wool goods will have the better hearing that they deserve.

Importers are wondering where the unprecedented advance in fine wools will end. With the increase in cost, many duties keep steady pace; the combination of the two is likely to diminish the demand from certain quarters.

There is no such thing as striking an average that will show the general advance in prices within a year, but bids on most lines are at least 10 per cent. higher.

Hosiery circles are almost equally busy. Established lines are not to be had for immediate delivery and choice fancies are spoken for fully four months ahead. The foreign situation grows stronger, if anything. The scarcity of goods in Chemnitz makes prices there firm as a rock. The buying contingent reached New York rather earlier than usual this year. South American exports have never before been as heavy.

Manufacturers of full fashioned goods, as usual, have rather more than their share of prosperity.

Seamless hosiery is equally well sold up, but many seamless factories

are poorly off for yarn, considering the rising market. The rise of 10 per cent. or thereabouts in seamless goods by no means makes good the advance on cotton yarns, and to make the matter worse, many goods were sold at the lower figures prevailing in November. Many failures are sure to follow.

An early termination of spring business is looked forward to.

Jobbers are taking advantage of conditions to enforce better terms of sale. Many are refusing to break assortments and split dozens, a style of doing business that falling markets encouraged.

Plaids are being shown in new combinations of color that prove decidedly attractive. The vertical and crossover stripes, too, are especially to be commended.

There is much speculation over the changes to be made on the hosiery tariff by the reciprocity treaty with France. Nothing is certainly known regarding its terms, but German importers are afraid they will be placed at a decided disadvantage.

Cost of Making Men's Half Hose.

We have received a number of letters from well-posted men in reference to the article which appeared in our last issue on the cost of making men's half hose. Believing that the information received will be of general interest to our readers, we publish them below without comment, and also republish the figures given last month for the purpose of reference.

The original question which brought up the subject was as follows:

Editor Textile World:

Can you inform me about what the cost will be of a small plant for making 50 dozen men's half hose daily, of 160 needle goods, made on ¾ automatic machines, to weigh about 1½ pounds to the dozen, with two threads of No. 20 carded Peeler cotton? I should also like to know about what the cost of making the hose would be at present prices and about how much working capital would a man need for this plant and output?

PEELER.

The answer published was as follows:

Any estimates given in answer to such a question can, of course, only be approximate, and at the present time especially would be subject to change on short notice, owing to the variation in the price of iron and the general upward tendency in everything that goes to make up the cost of machinery construction. A well-posted man, of whom we asked an opinion, gives the following:

Estimated cost of plant for making 50 dozen men's half hose daily (160 needles):—

12 footers at $90.00	$1080.00
2 ribbers at 100.00	200.00
2 loopers at 65.00	130.00
1 press at 125.00	125.00
1 dryer at 125.00	125.00
Tables	50.00
Shafting, pulleys, belting, etc.,	175.00
Press paper, boards, etc.	25.00
Extras	100.00
	$2010.00
Working capital	2990.00
Total capital invested	$5000.00

We think he has allowed none too much for working capital. A man can turn his working capital about four times a year on this basis, and if he took an active part in the business himself, could show a fair profit.

The following prices given for work vary according to the location, but we think they are a fair average.

Knitting, per dozen	.07
Topping, per dozen	.04⅛
Looping, per dozen	.04
Finishing, per dozen	.04½
Boxes, bands, etc.	.02½
Cases, freight and cartage	.02
Waste, seconds, repairs, etc.	.03
Dyeing	.09

In addition to the items above, there is the cost of the yarn, general mill expense, interest and insurance, discount and commission. In general mill expense should be included the cost of overseer and clerical force, power, etc.

The following letters on the subject have been received:

Editor Textile World:

At present prices I do not think any one can run a plant of less than 75 dozen per day for men's half hose and

hold his own. The following I consider very conservative figures, and if the manufacturer had to train his own help, it would cost him $1000 before he could successfully run his factory at these figures. I have tried it to my sorrow. If he had to send his goods away, say to Philadelphia, to be dyed, it would be, at least, 30 days before he would have them finished and in boxes. I have put the capital higher than I would otherwise, so as to allow for an inevitable loss the first year of an extra $1000.

A.

Editor Textile World:

I think the estimates given in the article which appeared in January are very fair and conservative and comments well made. Such estimates cannot be given exact except for known places and conditions. My own experience has been altogether with full automatic machinery, in which I am a great believer, and I think the inquirer will make up the difference in cost of two kinds by saving in labor, etc., but "that is another question."

CODE.

Editor Textile World:

The cost of making men's half hose depends nowadays very largely on locality. My experience has been about as follows:

Knitting, per dozen	$.05
Topping, per dozen	.04
Looping, per dozen	.04
Finishing, per dozen	.03½
Boxes, bands, etc.	.03
Shipping, freight, etc.	.01½
Menders	.01
Dyeing	.08
Mill expense	.12

I think the figures given on the cost of the plant are full high, but the total investment is all right, as whatever was saved in the cost of the plant could go into working capital, where it would certainly be needed. I am in favor of knitting goods in the white, and then dyeing them fast black or tan. We are working now on dyed yarns, and it makes more waste and is hard on the machines.

TAN.

Editor Textile World:

We think the cost of ¾ or ⅞ automatic footers for 160 needle half hose at $90 is rather low and should be $100.

MEADOW.

Editor Textile World:

We should estimate the cost of the plant as follows:

12 footers at	$95.00
2 ribbers at	80.00
2 loopers at	78.00
Press	150.00
Dryer	125.00
Tables	50.00
Shafting, pulleys, belting, etc.,	175.00
Press paper, boards	25.00
Extras	200.00

We think the working capital is figuring it too close. $3500 ought to be allowed, and the total capital invested should be nearer $6000 than $5000. Of course, this is not the cheapest plant that could be installed, but we think in the long run it would prove the most economical. The ribbers are single feed for tops, and the footers are two cylinders each. Both the press and dryer would have a capacity for larger production, and in the event of increase in capacity, which would probably be made if the plant were successful, would answer for some time. The investor should also be prepared to take an active part to make such a small plant pay.

ADAMS.

Editor Textile World:

I think you ought to add three or four more machines for knitting feet to make 50 dozen per day, and the price for a first-class stocking press is too low. I should put it at $200. If this party was a personal friend of mine and wanted my advice about putting up such a plant, I should say that unless he is in a very advantageous locality, he had better not do it.

It is too small. It ought to be three or four times as large and properly handled at that to make money out of the investment.

NEWTON.

Editor Textile World:

We should make changes in the estimate on the cost of plant as follows:

11 footers at	$99.00
Press	150.00
Dryer	250.00
Tables and bins	100.00

and we think a man ought to allow $5000 for working capital.

B. S.

Editor Textile World:

I notice that the estimate on the cost of machinery in the article on cost of men's half hose which appeared in your last issue does not make any allowance for power to operate the plant. It seems to me also that if the estimate on the cost of dyeing, finishing, boxing, etc., is correct, it would be cheaper and better to have that part of the work done by some good dyeing and finishing establishment. In that way you would save the cost of the press, dryer and boards, and would also effect saving in space required to operate the plant.

K. A. N.

Editor Textile World:

I noted with interest the article in the January issue on the cost of men's half hose. I have had some experience in this matter, and I do not believe a mill of this size can be made to pay. I am in a well-situated Southern town, and was induced to go into the hosiery business two years ago on the idea that small manufacturing industries in the South would pay. I started with $7500 capital, but very soon realized that we must do more business to succeed, and so have added from time to time, until now we have invested in the business about $60,000, which includes a modern, up-to-date dye plant which cost over $4000. We have put in full automatics. The first 18 months we made no money, but with the improved automatic machinery, dye plant and our large investment, I am happy to say we can make money; but our experience offers no encouragement to small mills.

SOUTHERNER.

Editor Textile World:

I read the article in January issue, and think there should be another looper for this plant, but I should not get a dryer. The press would be sufficient. Press papers, etc., would cost, at least, $25 more than your figures, and the working capital ought to be $5000. Topping costs us 6 cents per dozen, and boxes, bands, etc., 3½ cents. Let me add a word of caution to your inquirer. Keep a sharp lookout for sharks in this business; the sort of buyers who do not value their word as good as their signature. There are so many manufacturers in the business now that the buyers work one against the other and grind them down unmercifully. There are, however, some honest and truthful buyers who appreciate an honest manufacturer. With the exception of the points I have named above, I think your remarks are about right.

D. J. O.

Editor Textile World:

I have read the article on the cost of knitting hosiery with interest, and agree with your figures on the estimate of cost of plant except I think 10 good footers ought to do the work. In our mill the cost of the goods figures about as follows. We do our own spooling:—

Yarn	$0.40
Spooling	.01
Ribbed tops	.01
Topping	.05
Knitting	.08
Looping	.05
Inspection, mending, etc.	.02
Dyeing	.09
Finishing	.04½
Boxing	.02½
Fixed charges	.10

I figure the yarn at 26 cents per pound. Of course this changes from

time to time. These are New England prices, and they are higher than those you give, which I suppose are based on Philadelphia or Southern figures. For working capital, I would rather have $5000 than $3000.

C. T.

Cost of plant:—	
12 footers at $90.00	$1080.00
12 extra cylinders at 18.00	216.00
2 ribbers at 80.00	160.00
2 loopers at 55.00	110.00
1 press at 125.00	125.00
1 dry box	125.00
Tables, bins and furniture	75.00
Steam boiler	100.00
Gas and steam fittings	60.00
Shafting, pulleys and belting,	200.00
Boards, etc.	30.00
Sundries	100.00
Power to be hired	
	$2381.00
Working capital	5619.00
	$8000.00

Cost of goods:—

Present price of 22s carded peeler yarn on cones, 18½ cents.

1½ lbs. yarn at 18½c.	.27½
2 oz. waste	.02½
Knitting, per dozen	.07
Topping	.05
Looping	.05
Dyeing, 6 cents per lb.	.09
Boarding and pressing (labor only)	.04
Boxes, bands, etc.	.03
Cases, freight and cartage	.03
Mending and overlooking	.02
Needles and repairs of machinery	.02
Depreciation 10% per annum on $2381.00	.01½
Incidental expenses, say	.05
	.76½

MANAGER.

Editor Textile World:

The following figures are what we should estimate on such a plant:—

10 footers at $100.00	$1000.00
2 ribbers at 75.00	150.00
2 loopers at 58.00	116.00
1 press at 125.00	125.00
1 dryer at 125.00	125.00
Tables	34.00
Pulleys, shafting, belting, etc.,	96.00
Press paper, boards, etc.	13.00
Extras	20.00
Total	$1679.00

The cost of knitting and topping, outside of a few large cities, would, we think, be 5 cents per dozen for knitting and 3½ cents for topping, while in Philadelphia and Riverside the prices are 7 cents for knitting and 4 cents for topping, and in some country towns it is done even for less than the figures named above. In one place we know of, knitting is done for 3½ cents per dozen, topping 2½ cents, and looping 2¼ cents. Our knowledge of prices is more or less limited to the locality around Philadelphia.

MACHINERY.

Editor Textile World:

I have read with much interest what has been said as to the cost of making 160 needle half hose. We cannot produce goods at such low figures as some of those given. Knitting costs us 9 cts.; topping, 5 cts.; looping, 5½ cts., and then winding costs 50 cts. per hundred pounds; inspection, 40 cts. per hundred dozen; the finishing, 6 cts., boxes, 3 cts. each; bands, cases, freights, cartage, 3½ cts. The waste is about 7 per cent. and seconds 4 per cent. Repairs cost about 1 ct. We also allow for the breakage of one needle per dozen, which is another cent. The dyeing figures about the same, 9 cts. per dozen. I do not see how first-class goods can be turned out at such prices and especially in such small quantities.

N. H.

[A number of interesting letters have been received which, through lack of space, must be withheld till next month.—Ed.]

The American Trimmer.

The American Trimmer for sewing machines, illustrated herewith, and manufactured by the American Machine Works of Philadelphia, is designed to overcome the defects of other trimmers, and to combine their peculiar advantages.

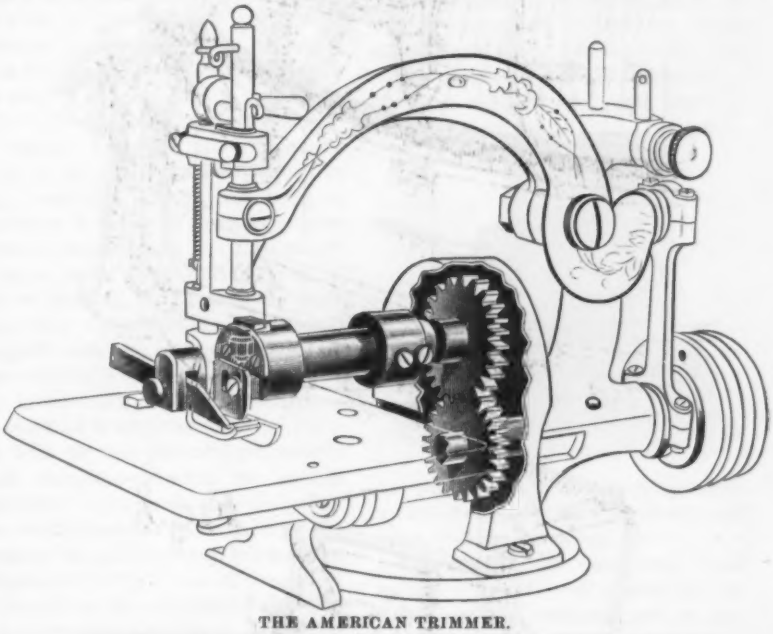
Trimmers may be made to work upon either one of two principles—with a rotary knife or with an oscillating knife. One of the difficulties with a rotary knife, in the practice of some, seems to be, that as the knife is revolving, whether the work is at rest or feeding, there is a slight roughness on the edge of the seam made by the alternate stopping and starting of the work.

With the oscillating knife trimmers there is claimed the advantage that they cut while the work is stationary, the knife being timed so as to go up and down with the needle bar, it being up out of the way of the cloth when the feeding is done. This, it is said, insures the work being cut sharp and clean.

With this in view, the points to be desired are that the parts which oscillate be as light as possible to avoid any racking wear, which is often present in high speed machines with reciprocating parts.

Another point to be desired is that the means by which the rotary motion of the shaft is converted into reciprocating or oscillating motion, shall be as little subject to wear as possible.

Upon the American Trimmer the oscillating knife is fastened to a vertically moving hardened steel knife bar, which is accurately fitted to the groove on the barrel of the trimmer.



THE AMERICAN TRIMMER.

This knife bar has a small horizontal slot in which the square hardened steel block slides to and fro, this block being moved by a small eccentric stud upon the shaft of the trimmer.

By this device the eccentric is but one-eighth of an inch in diameter, occasioning but little friction and wear upon these parts.

Vulvanized fibre gears of equal diameter are used to connect the trimmer shaft with the sewing machine shaft, and when they are put on the ma-

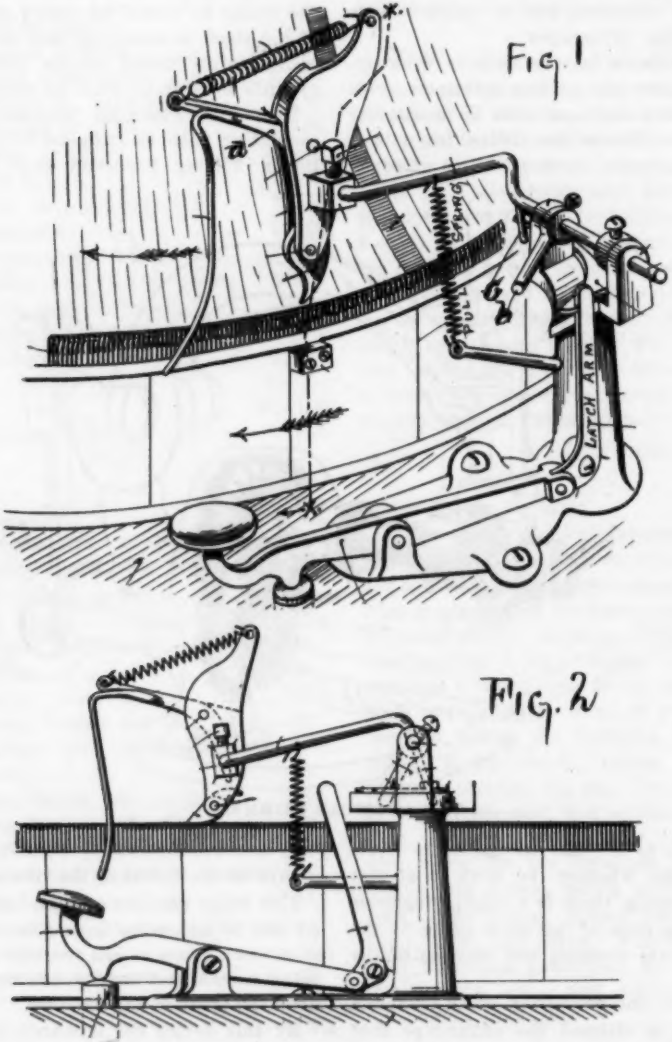
chine they are arranged so that the knife oscillates in unison with the needle bar and cuts when the work is stationary. These vulcanized fibre gears are noiseless, and are claimed to be more durable than steel gears.

The width of the seam is instantly adjustable from nothing to three-eighths of an inch by merely unscrewing two screws, and moving the barrel which carries the knife with it laterally.

A rigid frame or bracket holds this barrel to the frame of the sewing machine, and the barrel is carefully reamed to exactly fit the hardened and ground shaft which has a bearing for three inches in length within it.

The trimmer is amply supplied with oil holes and is designed to give constant year in and year out service with the minimum attention in the hands of a most careless operator, and at the highest speed.

It may be fitted to a Wilcox & Gibbs, Union Special, Singer Hook, and Wheeler & Wilson No. 10 machines.



A NEW STOP MOTION. (See page 273.)

A New Stop Motion.

The illustrations that we give, page 272, show in part a combination of parts adapted to operate in connection with the ordinary stop-motion as used for circular-knitting machines, whereby the machine is instantly stopped when the presser-foot engages with a hole or such imperfection in the fabric during the progress of knitting.

Fig. 1 shows the relative position of the stop motion, with the presser-foot bearing upon the knitted fabric. Fig. 2 is a front elevation of the same, showing the position the attachment assumes when the machine is stopped by a broken needle or imperfection in the cloth.

The operation of the mechanism is as follows: Assuming the attachment to be in the position as illustrated in Fig. 1 and the cylinder revolving in the arrow direction, if from any cause a needle should break or a hole should be made in the fabric during the progress of knitting, by the time the cloth with such imperfection passes upon the guide-wire the edge of the presser-foot will strike against the edge of the hole in the cloth, and the movement of the cloth as it revolves with the cylinder will tilt the presser-foot around from engagement with the spring-controlled trip-lever a, and the guide-box will be brought downward by the action of the pull-spring to the position as indicated in Fig. 2, which movement is limited by the adjustable stop-arm b, set-screwed to the shaft and which strikes against the top plate of the standard, and by the time this movement takes place the inner arm c of this shaft will have swung rearwardly the horizontal latch-lever d from engagement with the vertical latch-arm, and finally the action of the spring-plug situated in the bed-plate will have released the shipping-lever, and thus stop the machine.

—One of the chief objects of technical instruction is to secure manufacturing supremacy.

Drying Knit Goods with Hot Air.

One of the great improvements incident to recent progress in the manufacture of knit goods is that resulting from the introduction of up to date methods of drying. It is now clearly recognized that heat alone will not dry, but there must be circulation of air, and as fast as the air (which in its heated state greedily absorbs moisture) becomes saturated, new volumes must be admitted to take its place and continue the process.

The simplest of all arrangements of course consists in the hanging of the goods in a room through which hot air is circulated, but the character of the knit goods is such that resort in

the past has been had to forms upon which the goods were stretched and dried without wrinkling.

The difficulty of underwear made in the roll has very materially affected previous methods, and in fact successful production of goods of this character has been made possible only through the introduction of special drying devices. To the perfection of this method the B. F. Sturtevant Co. has given much attention during the past few years.

In the accompanying illustration is presented a type of heating apparatus which has been adopted by many mills for this purpose. The apparatus as shown consists of a fan which is connected to a steel pipe heater through which the air is drawn and forced into a system of drying pipes.

The heater is made up in sections, so that it is rendered readily portable. It is enclosed in a steel plate jacket rendering it fire proof, and the high velocity of the air across the pipes so greatly increases their efficiency over that of direct radiation that only about ⅛ as much surface is required as would be required if the pipes were exposed in an open room.

The hot air from the drying pipes is so readily applied to the material that it is rapidly dried as it is rolled up, and being thus left in the roll, it remains properly stretched and without wrinkles. Their claim is that the drying process is very considerably shortened over that necessary when a system of hanging is employed, and the general quality of the goods is greatly improved, while the cost of production is materially reduced. The success which has met the introduction of this method is such as to warrant an investigation on the part of progressive manufacturers.

The Industrial Overseaming Machine.

For three years past the people connected with the enterprise now known as the Industrial Mfg. Co., of Camden, N. J., have been perfecting their plant and carefully preparing and perfecting their line of machinery before putting it on the market. The result is a very complete and perfect machine, designed for the use of hosiery and underwear manufacturers, and which the builders feel confident is one of the best overseaming sewing machines ever offered to knitting manufacturers. Mr. Dubois, the manager of the plant, is well known as a successful and intelligent business man, and the machine which the company is now putting out embodies the latest ideas. A large amount of money has been expended in special tools to produce their machines, with the idea that every part of every machine shall be interchangeable. They have had an experience of nearly two years with the machine on the market, giving it all sorts of practical tests, and are now ready to give the strongest kind of guarantee as to its merits.

A feature which will appeal to manufacturers is that they sell their machines outright at a fair price and subject the manufacturer to no royalty payments. From their experience in the business, they are confident that the royalty system is not popular with the great majority of knitting manufacturers, and they believe that their plan of selling direct will meet the approval of the trade and receive the hearty co-operation of those manufacturers who object to the royalty system, and to whom they now feel confident is offered a machine which is second to none, and contains all that is desirable in an over-seaming machine.

It is now sold with or without a trimmer. They invite correspondence.

Machine for Half Hose.

Some interesting series of mechanism has recently been perfected designed to knit that class of goods commonly known as "half-hose," in which the needle cylinder revolves and is equipped with latch-needles.

The principal features of the mechanism are for handling the main and splicing threads, for effecting the rotary reciprocating motion of the needle-cylinder in the process of fashioning the heel and toe; for narrowing and widening in the process of fashioning the heel and toe; for changing the rate of speed from regular to fashioning knitting; to stop the machine at the completion of a stocking and return the pattern-wheel to its proper starting position; for knitting into the back and sole of the heel of the stocking short supplemental courses so as to give the heel greater fullness and elasticity.

Did space permit, we would be pleased to illustrate and describe in detail the features of these devices, but their complication prevents us.

—One of the most interesting branches of textile manufacturing is that of velvet, plush or pile weaving.

SILK DEPARTMENT.

Broad Silk Weaving.

(Continued from January.)

The shedding mechanism for taffetas requires nice adjustment and is subject to much the same rules as for cotton cloth. Constant attention on the part of the weaver is positively required to catch defective warp threads before they get into the harness and reed. Defects in the filling ought to be watched for such as knots on the quill which cause the filling to pluck the edges or lumps, causing the filling to make a thick place in a single pick. Often, a rough place in the shuttle box, or on the lay, will cause the filling to catch; and on the next pick from that side, the caught thread will be carried between the warp which, for perfect cloth, requires to be removed. No stop motion being used, it often happens that the filling will break, and the loom run for a few picks, without filling. Then the filling will catch again, and go on weaving, leaving an open place, and in figured work, destroy the pattern.

The warp threads will often catch behind the back rod, and before discovery drag the back rod up against the front rod, when, sometimes, they will release themselves, while, at other times, they will break. In either case they will, by the extra strain thus put on them, cause an undesirable mark in the cloth, which requires and calls for "picking back," a feature in weaving, the least done the better for perfect work.

The term "picking back" is used to designate the work as the words imply, of pulling back defective work in the fabric. If for a few picks, the loom can be turned over, and the picks of filling removed as they are released in the warp. If a large number of picks are to be removed, the best plan is to turn the loom to the top or bottom centre of crank shaft, whichever way the loom may normally operate, so as to bring the harness on a level with one another. The warp weights are then released from holding a tension on the warp, by raising the back, or counter, weights, thus allowing the front weights to rest on the floor. The take-up is then released to make the cloth slack. The cloth at the edge is separated, and the filling cut back at the beginning of the defect. The opposite edge is treated the same. If a very wide fabric, the filling is cut in the centre, and the "pick-back" (similar to a bone, or ivory, crochet needle, with a point where the hook end is) is then used to pick the woven filling out; the operation being done by sliding the end of the "pick-back" over top of the cloth and towards the reed, then inserting the end of the "pick back" under the one, two or three filling threads thus separated, raising them up from and out of the warp, grasping them with the left thumb and finger, and drawing them free from the warp, and proceeding thus until the whole has been removed. The cloth or warp is then slackened, the warp weights are raised alternately, the warps tightened, the lay turned to the front centre, and the take-up manipulated so that the cloth is got in the right position; and the right shed being found, the loom is started. It will thus be seen that "picking out" is a process requiring some time, and the cause of much silk waste being produced.

The edges in silk weaving are invariably put on separate spools, made expressly for the purpose, with a head for a friction cord. This enables the edges to be specially weighted, so as to withstand the heavy friction put on the filling. These edges are often a source of trouble and annoyance, if not carefully watched and attended to. A knot or other defect, or the quill running out, or the finishing end of the filling fast in groove in quill,

will, by plucking at the edges, break more or less threads, which require to be immediately replaced, or the remaining threads will break under the heavy tension of the weights upon the edge spools. We are thus, with the plain loom, limited to a taffeta weave and pattern; and to make a twill or small satin of small scope, we require a system of cams affixed under or at the end of the loom, or some other description of shedding mechanism.

There are a number of makers who claim superiority for their machines. What we want is a machine that we can quickly and cheaply attach to our loom, to enable us to make the twill or satin goods we may have an order for.

As a machine capable of operating, say, 24 shafts, will also operate 2 shafts, we might have placed one of those machines termed "dobbys" on the loom, but, for illustration sake, we started with a plain loom.

Now let us choose an overhead "dobby" for our immediate wants. The top frame work of our loom terminates at the harness rollers, and has only a single rail. We must then construct an elevated arrangement to hold our dobby. To accomplish this, we can secure to each side of the loom frame, vertical uprights of wood or iron, to the tops of which we secure cross pieces, on which we place rails, to join the cross pieces together. On these rails we secure our dobby, over the centre of the loom.

On the "dobby" hooks we tie cords, to which we fasten by adjustable knots our harness. On the floor under the loom we place adjustable springs attached to the harness.

We connect the "dobby" lever to the outer end of the crank shaft, by a connecting rod, and a crank lever or bracket. The pattern cards are placed upon the cylinder, and if a large number is required, a card rack is made, in which the cards are caught and held.

Harnesses operated by this method have a greater strain upon their eyes when the warp is opened, to minimize which, the back warp roller should be slightly raised. If we use an open and close shed dobby, our line of beating the filling up, is in the centre of the depth of the reed; if a close shed, single-lift "dobby," our warp rests at the bottom of the reed. The reed is stronger at the top or bottom than in the centre, so that the filling will draw the warp in more when an open-and-close shed is used, than when a single lift is used, a matter for consideration in the weaving of different fabrics.

We have, with the addition of this dobby, augmented the capacity of our loom, to weave varied fabrics, to a limit of 24 harnesses, or, in other words, we have provided ourselves with the means to weave patterns which require not more than 24 threads to repeat.

With this capacity and some knowledge of designing and drafting, the warp threads, patterns that would apparently require a jacquard to make, can be woven; and the whole gamut of "shaft weaves" be run in seasonable goods.

JOHN.

Artificial Silk.

Paper read by Joseph Cash, before The Society of Arts, London, England.

It is a trite saying that all inventions are creatures of evolution. I shall give a short description, therefore, of a few attempts to produce the appearance of silk before the perfected artificial article of today became an established fact. Some were partially successful in effect, and others have been a pronounced commercial success, adding greatly to the variety of the cheaper textile fabrics.

Spun glass is probably the earliest production which resembles natural silk. The thread is perfectly flexible, possessing great brilliancy, and is produced in a variety of colors. The feel to the touch is soft and smooth; it can be woven into many textiles, and is specially useful in millinery articles,

where warmth is not a necessary adjunct.

Polished or diamond cotton is a lustrous looking article, and in the fine sizes, or counts, as it is called in the trade, is silky in appearance and soft to the touch. An enormous trade is done in this article for dress goods, as it is often used in combination with silk. The process of producing it is very simple, waxy and starchy substances being put on the thread in a liquid emulsion; the yarn is then transferred to a polishing machine with revolving brushes, which completes the process.

A process for giving a silky appearance to cotton has lately been brought to the notice of manufacturers with very satisfactory results. The process is practised by most cotton dyers, there being no valid patent. The name is derived from the inventor, John Mercer, who discovered the process in 1844. The cotton yarn is passed through strong solutions of caustic lye. The yarn must be at full tension during the whole operation, even until it is quite dry. Mercer's theory of the action of caustic soda is that received today, viz., that the mercerized yarn is a hydrate of cellulose, the first action being the formation of a compound of sodium oxide and cellulose. The subsequent washing replaces the sodium oxide by water, which is held by the cellulose like the other metallic oxide. Such a theory as this gives us very little light on the matter, and does not explain the difference between the hydrate formed and the original hydrate. It can be dyed any color without materially affecting the brilliancy which has been imparted to it by the mercerizing process.

Vandura silk is a gelatin thread, therefore animal in its composition, and more nearly allied to natural silk than any of the imitations already described; Adam Millar, the inventor and patentee, quite recently died, unfortunately before he attained the perfection at which he was aiming. The manufacture of the silk is conducted by pressing an aqueous solution of gelatin through a very fine glass capillary tube. On issuing therefrom the thread is laid on an endless band which carries it some distance to allow it to dry; from the end of this band or table it is wound on to bobbins ready to put into skeins for the manufacturer. I am of the opinion that this article will not meet with a very great commercial success, as, the gelatin being soluble in water, it cannot be dyed after the thread is made. Therefore the solution of gelatin must be colored to the required shade before being spun. The impracticability of this is manifest when I tell you there are at least fifty colors with fifty shades in each color, and at least four sizes of thread; the stock would be at least 990 lbs., if only 1 lb. of each size and color was made.

Mr. Millar described his process as follows:—

"I take 4 lbs. weight of the best gelatin I can get, break it up into granular pieces such as will pass through a riddle of four meshes to an inch, 16 meshes per square inch. I place the broken gelatin in a melting vessel, and add 2 lbs. of cold water, and stir it well, put on a cover or lid and let it stand for one hour. The vessel is next placed in a can of hot water and kept heated at 120° Fahr. for another hour, stirring it once or twice. By the end of the second hour I have a solution of gelatin of uniform consistency, containing 66 per cent. of gelatin and only 33 per cent. of water—a very thick solution.

"The group of filaments are next twisted together and spread out in a thin layer on an open metal reel, about 1 foot in diameter. A number of these reels of plain gelatin yarn are now placed in a chamber in which a very small quantity of formaldehyde has been poured, and is therefore filled with formalin vapor—about 80 minims of formalin to a space of 10 cubic feet. An exposure to this vapor at ordinary temperature completely changes the gelatin. It is no longer soluble, even

in boiling water, nor in any solvent that I have tried, and has a splendid lustre.

"The reels are hung up to allow all smell of the formalin to disappear, and the artificial silk is finished, needing only to be wound on to bobbins for the convenience of handling before it gets into the hands of the textile manufacturer.

"You will have noticed that this process for producing an artificial silk, which I have described, is a chemical process, but it is also a mechanical process. The successful substitute for the product of the silkworm must be a yarn made up of very fine filaments, so as to be smooth to the touch, and so pliable as to feel soft to the handling. The material of real silk, when obtained in somewhat thick threads, is neither smooth nor pliable, but is very harsh to the touch, and very stiff in handling. Indeed, to one not acquainted with the fact, it is very difficult to understand how the softest of velvets are produced from this harsh, stiff material—so stiff that it can hardly be tied into a knot. It is this extreme fineness of filament required in any artificial process which makes the mechanical part of the process such a dominating factor in the commercial aspect of the case.

"The nipples of my machine have a bore of one-hundredth of an inch, but the filaments drawn from these nipples may be only one-thousandth of an inch in diameter. The flow of the liquid through the nipples is regulated by air pressure. An india-rubber pipe leads from a receiver of compressed air, and has its other end attached to a small pipe fixed to the air-tight cover of the cylinder which contains the gelatin solution. The endless traveling band, on which the threads fall, and by which they are drawn away rapidly, moves at a uniform rate—say 60 yards per second, but if the speed be increased to 120 yards the filament would be twice the fineness; the same result is obtained by reducing the pressure in the air receiver or reservoir."

Several persons have given their attention to the perfecting of the manufacture of collodion silk, among whom are Count Hilaire de Chardonnet, Dr. Lehner, and Nobel of cordite fame. The different systems vary only in detail, so I shall describe the most successful one, known as the Chardonnet silk. I first saw this artificial silk at the Paris Exhibition of 1889, where it obtained a "Grand Prix." Previous exhibits were made of artificial silk in 1878, but no commercial success was attained for many years.

A public company for the manufacture of artificial silk by the Chardonnet process has been formed in England. The factory, extending over two acres, is at Wolston, on the river Avon, near Coventry, and will be capable when filled with machinery of producing 7,000 lbs. of silk per week.

The first stage of manufacture is the nitration of cotton or wood pulp producing pyroxyline, discovered by Pelouze in 1838. The greatest care must be employed in conducting this operation, as it is the most important one in the whole process; mistakes sometimes even occur at the long established factory at Besancon in France. The process of nitration of cellulose is the displacement of a few molecules of hydrogen by nitric peroxide. There are several varieties of pyroxyline which are obtained by using different mixtures of acid. The highest nitrocotton product, gun-cotton or trinitrocellulose, is useless for the manufacture of artificial silk, as it is insoluble in a mixture of alcohol and ether. To obtain the pyroxyline or binitrocellulose suitable for the production of collodion for our purpose, a mixture of 15 volumes of sulphuric and 12 volumes of nitric acid is made; two pounds of bleached raw cotton is then taken and put into an earthenware jar with about three gallons of mixed acid; this is left standing for four to five hours, when the nitration is complete.

The object of the sulphuric acid is to take up hygroscopically the excess of water produced leaving the nitric acid of which there is always an ex-

cess. The only known way of testing the quality of the pyroxyline is the use of the microscope in conjunction with the polariscope. A small piece of pyroxyline is taken from one of the jars, thoroughly washed in water and dried, it is then moistened with alcohol, when the colors exhibited should be in exact proportion which practice has proved to give the best results.

The pyroxyline is now taken out of the pots and subjected to pressure to extract all the acid possible. This extracted acid is not wasted, but is renovated with a mixture of new acid and used again for more cotton. From the press the pyroxyline is taken to the washing-room and at once put into the washing machine, called a Hollander, and similar to those used in paper-making for washing pulp.

This washing continues for from 12 to 15 hours until the acid is thoroughly eliminated; from thence the material is removed to a centrifugal machine to extract the moisture, which must not exceed 28 per cent.; if too much water is present the collodion will not be tenacious and therefore will not spin. The pyroxyline is now ready for dissolving in a mixture of alcohol and ether. The pyroxyline is placed in a cylinder, with a mixture of 40 parts alcohol and 60 parts ether; the cylinder is then hermetically sealed and made to revolve slowly for 12 hours, when, if the pyroxyline is good, all should be dissolved; the resulting mixture is collodion. The next process is the filtration. Upon this depends the amount of production from the spinning machinery supposing the collodion be good. The filtering is to eliminate every particle of suspended matter which may exist in the collodion before it arrives at the spinning machines as grit and seeds from the cotton, or suspended matter in the washing water, or even trinitro-cellulose, which is insoluble in alcohol and ether, but this latter should never occur in good silk collodion. Each filter contains a sheet of cotton between calico. A pressure of 15 atmospheres is required to force the collodion through the filters; it is therefore first passed into an hydraulic press, by the aid of which it is forced through the filters and into the collodion reservoir, where it should remain as long as possible to allow any bubbles to rise to the top, for should they pass into the glass silk-worms, the continuity of the thread would be broken.

A pressure of 40 to 45 atmospheres is required to force the collodion from these reservoirs to the spinning machines, which are constructed with pipes running on each side. Into these pipes are screwed a number of taps with a glass capillary tube fixed on the end, called a silk-worm, through which the collodion is forced by the pressure before mentioned; immediately it comes into contact with the air it solidifies, enabling the operative to take hold of the thread or silk, as it can now be called, and convey it to the bobbin. From twelve to twenty-four of these threads are run together on to one bobbin, according to the size of silk required, as is the case with natural silk. The silk would soon dry by the evaporation of the alcohol and ether if left exposed to the air; it is therefore kept moist by damp cloths to facilitate the next process of throwing and twisting. This is accompanied by putting on the silk the required number of turns or twists per inch. The reeling or skeining of the silk into a given number of yards in each skein is the next operation. One thousand or two thousand yards is the usual quantity, and according to the weight of skein so is the size designated. The Chardonnet silk is about 30 per cent. heavier in S. G. than natural silk, so the comparison of sizes is easily arrived at. The silk is still damp, and should now have the remaining alcohol and ether dried out of it. The inventor claims this to be one of the most important points to give the silk good dyeing properties.

The silk at this point of manufacture is very inflammable and quite unfit for use in textile goods, therefore a process called denitration is next carried out which reconverts our pro-

duct into cellulose, now very different in appearance from the raw cotton we commenced with, but practically the same in chemical composition.

One of the substances used for this purpose is sulphydrate of calcium.

The silk, now it is finished, requires no precautions in manufacturing more than cotton, in fact less, as there should be no loose fibre which can detach itself from the thread.

The bleaching is carried out in the usual way for vegetable fibres with chloride of lime and acid.

Up to the present time artificial silk has always been used in conjunction with other fibres in textile goods; the friction of weaving has a tendency to split the threads if used in warps, but this objection will no doubt be overcome.

Mantles for the incandescent gas light are manufactured of artificial silk, it being found that the salts of the rare metals can be mixed with the collodion with greater economy than with any other thread.

For braids and such classes of trimmings it is much more brilliant; for covering electric wires and all electric work it is better. Large works are in operation at Besancon, in France, producing 7,000 lbs. weight per week; but the demand is so great that they are making extensions to their works to enable them next January to produce 2,000 lbs. per day. The production at Sprietenbach is 600 lbs. daily. Other factories are about to be established in Belgium and Germany.

Collodion silk can never replace natural silk in articles where warmth is required, its composition being vegetable, and that of silk analogous to horn and hair or wool. The artificial product is to be preferred, being more durable than the natural when the latter is weighted in the dyeing up to 100 per cent. in colors, and as high as 300 per cent. in black. If this system of weighting natural silk for manufacturing dress goods continues, I am of opinion ladies will be asking for dresses of the new product in preference to the old, unless a guarantee is given that the article is pure natural silk.

Silkworms in China.

In reply to a California correspondent, the interpreter for the consulate-general at Shanghai, Mr. Barchet, on August 30, 1899, writes:

The domesticated silkworm (Bombyx mori) is extensively reared in the provinces of Chekiang, Keang-su, Szechuan and Shantung, and to a small extent in Hu-peh, Keang-si and Honan.

The silk industry is carried on profitably in Chekiang and Keang-su, where soil and climate are adapted to the silkworm, though even in these provinces there are localities where the silkworm does not thrive and the cocoons do not attain the size or weight they have in Ningpo, Shaohying, Hang-chow, Hu-chow and Wusich—regions which are famous for their silk.

The United States Consul at Shanghai writes that the cause of this difference is hard to explain, as the careful selection of eggs, the food, climate, and treatment are to all appearance the same.

Mulberry leaves form the staple food for the silkworm, and only when the supply gives out are the leaves of Cudrania triloba resorted to, which the silkworms will eat, but not so greedily; and the silk produced is inferior in quality to that from worms fed on mulberry leaves.

Though the domesticated silkworm is liable to disease, the Chinese variety is worthy of repeated trials, as it is fairly hardy when raised from healthy eggs and is decidedly superior to that of India or Japan; but sound and well-selected eggs are of paramount importance to success in such an industry. It would pay to have the eggs examined microscopically by an expert to insure that none but healthy ones be hatched. It would also be well to secure eggs from different lo-

calities (Chekiang, Keang-su, and other provinces) to find out which will thrive best under new conditions.

The wild silkworm of China and Japan is larger and is said to yield a greater amount of silk; but this is coarse and yellowish in color, for which reason it only commands two-thirds the price of ordinary silk.

If eggs of the wild silkworm are wanted for experiment, they can probably be procured by applying to the United States consuls at Chefoo, Shantung, or at Chungking, Szechuan (the home of the wild silkworm).

Eggs from the domesticated silkworm in the silk districts of mid-China may, as an accommodation, be procured through the consulate-general at Shanghai, provided the order is not for large quantities.

Counts of Yarn.

English Cotton Scale.—The hank is 840 yds., and the number of such hanks in 1 lb. avoirdupois is the count of the yarn.

English Spun Silk Scale.—The hank is 840 yds., and the number of such hanks in 1 lb. avoirdupois is the count of the yarn, with this difference from the cotton and other scales, that, whereas cotton 2/40s means single 40 doubled to 20s, spun silk 2/40s means single 80s doubled to 40s; spun silk 3/40s means single 120s doubled to 40s, etc.

English Linen Scale.—The hank or lea is 300 yds. and the number of these in 1 lb. is the count of the yarn.

English Worsted Scale.—The hank is 560 yds., and the number of such hanks in 1 lb. is the count of the yarn.

Continental Scale for Spun Yarns.—The basis of this is the number of thousand metres per kilogramme in the single thread. It is calculated in the same way as the English cotton scale. Thus 100/1 means a single thread running 100,000 metres per kilogramme. 100/2 means the same thread doubled, giving 50,000 metres of doubled yarn, etc. For cotton the basis is the number of thousand metres per half kilogramme (500 grammes).

English Net Silk Scale.—The hank is 1000 yds., and the number of drams that such a hank weighs is the count of the yarn.

Continental Net Silk Scale.—The hank is 400 French ells=476 metres=520 yards. 533⅓ deniers make 1 oz. avoirdupois. The number of deniers that one such hank weighs is the count of the silk.

Cellular System for Depositing Silk Eggs.

This at present seems to be the favorite method (the cellular egg commanding the highest price) among both the large and small culturists. One method in this system, used more by the small culturists, is to stretch a piece of cloth on a wooden frame, divided regularly into small squares by lines, and on these squares the moths are put, with tin cones placed over them. After they have laid their eggs they are removed and put into little cells, or boxes, divided to correspond with the divisions on the cloth, both of which are numbered. In this way, there is no mistaking the eggs of any moth that proves diseased at the microscopic examination, but it lacks proper ventilation, and besides requires a very careful numbering of the two sets, and this is not always to be trusted to the peasants who attend to the work.

Another way—used by the large culturists, and perhaps, on the whole, more approved—is the gauze cloth cells or bags. The mesh of these is large enough to give perfect ventilation, yet small enough to prevent the eggs from passing through. They are generally made by the peasants, and have strings running through the tops to gather up the openings after the moths have been put in. Two bags are operated by the same string, and these, in pairs, are hung up by the thousands upon poles which are suspended from frames which, by means of pulleys, can be raised or lowered, as desired, from the ceiling in the room where they are kept.

POWER DEPARTMENT.

ELECTRICITY—STEAM—WATER.

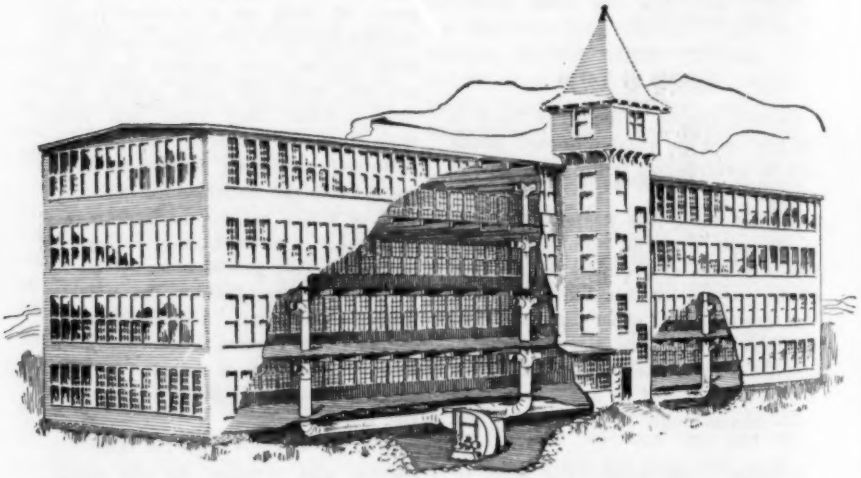
Factory Heated by Forced Circulation of Warm Air.

In this climate a necessary feature of the equipment of any occupied building is a system of heating. So much is demanded for mere comfort, and as a means of securing the highest efficiency of the individual. This is particularly true in the factory, where it is certainly the effort of the employer to secure the largest return for his expenditure in the line of wages.

But it is not upon the heating alone that either mental or physical efficiency depend. The room must not only be warm, but the air must be pure. In other words, good ventilation is as necessary as sufficient warmth.

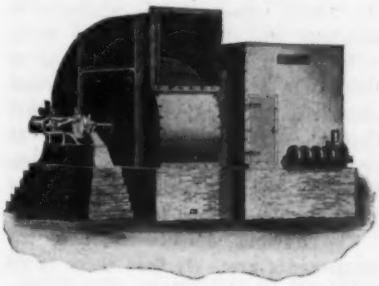
Numerous comparisons have been made between the efficiency of individuals employed in poorly ventilated and well ventilated apartments with surprising results as regarding the improvement under the latter conditions. The United States Pension Bureau furnishes a notable instance. Just prior to its occupancy of the present carefully constructed and thoroughly ventilated structure, the department was housed in numerous small and poorly ventilated buildings, in which the sickness of employees entailed an annual loss of time amounting to 18,736 days. In the new building the loss immediately dropped to only 10,114 days, a reduction of over 45 per cent. When we consider the conditions of yearly salary under which most of these clerks are employed, the financial return from improved ventilation is emphatically evident.

This new building was very effectually equipped with a mechanical system of ventilation, air being supplied by means of fans. The same method with its attendant advantages has now been in general use in well regulated factories for some 15 years. The pioneer in this line of development was B. F. Sturtevant of Boston, Mass., who during the late 70's and early 80's devoted much time to the design, manufacture and installation of special types of fans, with which as a rule were combined steam heaters for the warming of all air supplied. The incentive thus given to secure good ventilation has resulted in vast improvement in factory conditions.



The accompanying illustrations

serve to well illustrate the methods employed in mechanical ventilation and heating by forced circulation of warm air. The apparatus, consisting of a fan usually with attached engine and steel pipe heater, is placed in the basement of the building. If the building is already erected, or constructed of wood as here illustrated, a system of distribution by means of galvanized iron pipes is usually found most desirable. These pipes communicate with the main in the basement, are carried up at intervals throughout all of the floors, and upon each discharge the air through numerous outlets toward the outer walls. There it becomes slightly cooled, falls to the floor, and moves backward toward the centre of the room. The excess of pressure maintained within the building causes all



leakage to be outward, and prevents the entrance of cold air at cracks and crevices.

Such a building is surprisingly porous, and under slight pressure the air readily passes through even the walls themselves, the result being that if fresh air is drawn in through the heater, a constant change of air is maintained within the building, while its temperature is readily regulated at the heater itself, as well as the air distribution at the respective outlets.

The heater is made up in sections, each consisting of a cast iron base, into which are screwed steel pipes through which the steam circulates. These sections are bolted up together in groups of the required size, and are enclosed in a steel plate, fire proof jacket connecting with the fan. Either live or exhaust steam may be used in the heater. As a rule the former is utilized where it is not necessary for other purposes. When an independent engine is provided for driving the fan, the exhaust steam therefrom is usually condensed in a special section of the heater.

The great quantity of air drawn through such a heater vastly increases the condensation, and consequently the efficiency of the heating surface, so that one foot of pipe is rendered fully equivalent in heating value to five feet of pipe strung round a building. What is more, all the steam pipe is massed and under immediate control. There is no danger of damage from fire, leakage or freezing. During the summer the fan may be operated if desired for ventilating alone.

Ventilation of Factories.

Paper read by E. L. Hartley before the Royal Institute of Public Health Congress, at England.

The question of the compulsory ventilation of weaving sheds presents far greater difficulties than that of the regulation of humidity. The distinction is the usual one between positive and negative legislation. It is comparatively a simple matter to forbid employers from introducing more than a certain quantity of moisture into the sheds, but it is a totally different matter to compel them to adopt an adequate system of ventilation. That such legislation is desirable, if it can be made effective, is, in my opinion, beyond doubt. The question is how to make it effective. The crux of the difficulty is—upon whom is the responsibility to be thrown of deciding the mechanical means by which adequate ventilation can be obtained? There were three possible courses for the legislature to adopt:—

(1) The legislature might itself have conducted experiments, decided upon the system of ventilation, and enforced that system by statute.

(2) It might enact that a system of ventilation should be adopted, which would meet with the satisfaction of some authority appointed by it.

(3) It might have merely enacted that a certain standard of purity in the air should be maintained, and so have left the responsibility and expense of experimenting upon ventilating appliances to the factory owners.

The objections to the first course are obvious. It might have secured the adoption of the best system of ventilation known at that time, but it would have stifled future improvements. At that time the art of ventilation was practically unknown. The huge sums expended on the House of Commons, and the state of its ventilation, would hardly have encouraged the legislature to undertake the responsibility of settling the scheme of ventilation for the factories of the country. Such a course, too, was alien to the spirit of British legislation. The only point in its favor is, that it would have relieved the factory owners from the responsibility of expense, thrown upon them by the other courses, of experimenting in ventilation for the benefit of the country at large.

The British legislature generally avoids extreme measures, and (2) was the course adopted. Section 9 of the Act of 1889 enacted that:—

"In every factory . . . arrangements should be made and maintained, to the satisfaction of the inspector of factories for the district, for admitting, in every hour during which work is carried on, not less than six hundred cubic feet of fresh air for each person employed therein; and the arrangement for such ventilation shall be kept in operation, subject, as far as possible, to the control of the persons employed therein."

In carrying out the requirements of the law the system of small exhaust fans has been advocated, arranged in positions according to the peculiar conditions of each shed. The argument in favor of this system was that dust and fibre were removed along with the impure air at the various points of egress, and the small dimensions and low speed of the fans minimized the risk of drafts. The exhaust system has been very generally adopted throughout the country. The ordinary appliances for dealing with the humidity, temperature, and ventilation of an average weaving shed, today, are: (1) exhaust fans; (2) a range of 4-inch low-pressure steam piping for warming purposes; (3) a range of 1-inch high-pressure steam piping covered with composition (in order to diffuse as little heat as possible) and furnished with jets for the infusion of steam for moistening purposes. These rough-and-ready appliances, on the whole, act very well. If the moisture is excessive, it can be reduced by raising the temperature by the 4-inch pipes and cutting steam off the 1-inch pipes. If the moisture is deficient, the reverse operation tends to remedy it. The great advantage of this rough arrangement is its extreme simplicity, its small cost, and the fact that there is nothing to get out of order. If one out of several fans be stopped from any cause, its effect upon the whole shed is very small.

The obvious defects in these arrangements are: (1) that there is no provision for decreasing the temperature of the sheds in hot weather; and (2) that in adopting the exhaust system, control is lost of the air coming into the shed to replace the air taken out by the fans. The latter objection is a serious one. Unless proper provision is made for air inlets, the exhaust fans will merely suck air into the sheds from any possible hole or crack. The air coming in may be foul air from the closets, or impure air from some door leading into another room or warehouse, or pure air drawn from a hole in the roof near the fan, to be quickly expelled by the fan again.

During the years following the Act of 1889, the cotton trade has become the happy hunting ground of expert ventilating engineers. There are divers

machines for ventilating and humidifying, each of which, according to the owner, "licks creation." But trade competition, which on the whole is not a bad guide, has tended greatly in favor of the plenum system instead of the exhaust system. There are numerous machines on the market for forcing air into the sheds after it has been conditioned, that is, moistened, and warmed or cooled, as the case may be. These machines have been constructed to meet the objections pointed out above, but on the other hand, they are open to other objections. They are costly; they generally contain elaborate parts likely to get out of order; and, if they do get out of order, probably one-third, or perhaps one-half, of the ventilating apparatus of the shed is simultaneously stopped. Then the mechanical efficiency of a plenum fan is small as compared with the exhaust fan, and the distribution of the conditioned air into the room generally involves the use of large tubes. These tubes block the light, and are liable to become receptacles for dust and to pollute the fresh air. But invention is now busy in this direction, and one maker of plenum fans has already made huge strides in moving many of these objections.

Such was the position of the ventilation question when the Roscoe Committee issued its report, in February, 1897. The material portions of their report relating to ventilation are as follows:—

After long and deliberate consideration, your Committee recommend that it shall be made imperative that the arrangements for ventilation shall be such as will secure that no greater proportion than nine-tenths of a volume of carbon dioxide per 1,000 volumes of air shall be contained in the air of the sheds. . . . This limit will secure an amount of ventilation corresponding to about 2,000 cubic feet per head per hour, and your Committee believe that such a requirement would bring about a material improvement in the health and comfort of the workers.

The method which your Committee recommended for carrying out this proposal is, that the inspector be authorized to require manufacturers to maintain such arrangements as he may approve or specify, as will ensure the required standard being generally attained. This throws upon the inspector the task of making the necessary tests, and relieves the manufacturer from any uncertainty as to the requirements of the law. To meet the objections that might be raised to this —that too much would be left to the discretion of the inspector—the manufacturers should have the right to appeal to arbitration, in case they disagree with the inspector as to the means by which the standard of ventilation is to be maintained.

On the 6th of August, 1897, an Act was passed empowering the Secretary of State "to make regulations for the purpose of giving effect to such of the recommendations contained in this report as he may deem necessary for the protection of health in cotton cloth factories."

In pursuance of this power, the Secretary of State for the Home Department, on the 2d of February, 1898, made, among others, the following order:—

The arrangements for ventilation shall be such, that during working hours, in no part of the cotton cloth factory, shall the proportion of carbonic acid (carbon dioxide) in the air be greater than nine volumes of carbonic acid to every 10,000 volumes of air.

Provided this order was not bad in law—being inconsistent with the recommendation contained in the Report of the Roscoe Committee—the breach of it would, if continued or not remedied, render the occupier of the factory liable to a fine on summary conviction.

In my opinion this order is an impossible one to put into operation. The Roscoe Committee fixed the maximum of impurity at nine volumes of CO_2 (carbon dioxide, or carbonic acid), on the basis that the outside air contained

only four volumes of CO_2, and that the introduction of 2,000 cubic feet of outside air per head per hour would keep the air in the shed within the limit of nine volumes of CO_2 in 10,000 volumes. In this calculation the Committee presumably omitted the impurity generated by the gas when lighted. They also made no allowance for the occasions when the outside air contained more than four volumes of CO_2. Sir Henry Roscoe, in the Treatise on Chemistry by Roscoe and Schorlemmer, points out that "the average amount of CO_2 in free open country air is four volumes in 10,000, while in towns where much coal is burnt the amount may rise to six or seven volumes in 10,000" (vol. i., p. 47). It is perfectly clear, therefore, that the Committee intended to recommend that the arrangements for ventilation should be such that under normal conditions (i.e., when the outside air contained only four volumes of CO_2, and when no gas was being used) the amount of CO_2 in the shed should not exceed nine volumes in 10,000.

It is inconceivable that a Committee presided over by Sir Henry Roscoe should imagine that when the outside air contained seven volumes of CO_2 the air in the shed could be kept within nine volumes of CO_2. Yet this order appears to be based upon such a supposition. Quite irrespective of the quantity of CO_2 in the air outside, and quite irrespective of the time during which the gas in the shed had been burning, the owner was liable to prosecution if the air in the shed contained more than nine volumes of CO_2 in 10,000 volumes. And yet experiments made by Mr. Henry Davies, of Liverpool, corroborate the statement of Sir Henry Roscoe, and prove that in the valley of Blackburn, in certain conditions of the weather, the amount of CO_2 in the outside air occasionally exceeds even seven volumes of CO_2 in 10,000.

Under the circumstances, one is not surprised to find that when the deputation of masters explained their case to the proper officials in June, 1899, this order was completely deprived of its sting. These officials said:—"What the inspector is instructed to do is to see that the spirit of the instructions which we propose to give to the inspectors is carried out, and to satisfy himself that in each place under the Cotton Cloth Factories Act, 1889, the mechanical and other appliances for ventilation are such as in ordinary circumstances prevent the proportion of carbon dioxide gas in the air of the room from exceeding .9 parts per thousand while the appliances are kept in efficient order and use. What the Committee recommended was that the required standard be generally attained. We say it should be attained in ordinary circumstances, and not when there has been a large consumption of gas, not when there have been exceptional circumstances, but under ordinary and regular circumstances."

After this statement I think the masters may rest contented that this unfortunately-worded order will not be insisted upon.

Another vital distinction between the order and the recommendations of the committee arises from the old difficulty as to the responsibility for deciding the means by which adequate ventilation is to be obtained. This new order sought to throw the burden entirely upon the factory owner. He was to be prosecuted unless he succeeded in ventilating his shed so as to obtain the required degree of purity. Quite apart from the question of fact as to whether the standard of purity laid down by the order was not too high, there remains this fundamental question of principle. Under the previous Act of 1889, the arrangements for ventilation were under the control of the inspector. Under his direction the ventilating apparatus had been put up, and large sums of money expended. This new order would have rid the Home Office and the inspectors of the discretion as to the ventilating appliances which they had already exercised. If the appliances put up under their direction had been unsuccess-

ful, the factory owners, forsooth, were to be prosecuted! The Roscoe committee recommended a totally different principle. They recommended that the inspector should specify the ventilating arrangements sufficient, in his opinion, to ensure the required standard, so that the manufacturers would be relieved from any uncertainty as to the requirements of the law. If the manufacturers disagreed with the inspector's specification, the Committee recommended that the matter should be submitted to arbitration. The reason for this precaution is evident: inspectors come and inspectors go. It was necessary to place some check upon the vagaries of the inspector for the time being.

It is to this recommendation that we must look for a satisfactory solution of the question of compulsory ventilation. If trade competition cannot be trusted to select the best method of ventilation, some responsible and capable court of arbitration will have to be devised to settle the divergent views of masters and inspectors, and to ensure more continuity of policy in these matters.

The issues involved are too great to be left to the discretion of the inspector for the time being. The very fact that the inspector is devoting all his time to the study of ventilating factories tends to warp his judgment in these matters. Monotony of interest is apt to lead to monomania. It is not desirable in the interests of the cotton trade and of those dependent upon it that weaving sheds should be made perpetual experimenting grounds in ventilation, for the benefit of mankind at large.

—That there is likely to be any dearth of strong wools nobody believes. The shrinkage of the world's wool crop has been almost, if not entirely, in merino, and the tendency is for the crossbred clip to increase. The trade in frozen mutton has completely transformed the South American flocks.

The International Automatic Fire Sprinkler Co.

The International Sprinkler Company of Philadelphia, whose president is Clarke Merchant, of Merchant & Co. Inc., are manufacturing and installing a new type of automatic pipe sprinklers, as shown by the illustration. The links controlling the operation of the sprinklers are made of corrugated brass, the solder used in fastening them being prepared to withstand heat of different temperatures, normal being 165 degrees, medium hot rooms 286 degrees, excessively hot rooms (dry kilns, etc.), 400 degrees. These links have been tested under dead loads of 100 pounds and more without showing any signs of giving way, yet an ordinary match flame quickly melts the

fastenings and brings the sprinkler into operation. The normal pressure on the links when the sprinklers are set up for service is 14 pounds. Each sprinkler is tested under a hydraulic pressure of 250, in order to make sure they are perfectly tight.

When installing this system the sprinklers are placed an average distance of 8 to 10 feet apart, according to the construction of the building, open joist work requiring closer spacing. Under construction of this character sprinklers are "staggered" and so arranged that one sprinkler does not parallel the other; therefore, when in use the water is distributed over the entire area, instead of in spots and sections. When the sprinklers are in exposed places (near belting, etc.), they are furnished with guards to pro-

tect them from accidental injury. All exposed or outside pipes in connection with the International System are protected by tar paper and 1-inch felt covering, two thicknesses of each, and boxed.

A thorough electric alarm system is included in all installations by this company, together with electric indicator for the roof tank, showing high and low water mark.

The eave sprinkler made by this company is designed for outdoor use exclusively, being arranged in such a way that when in operation the entire front of the building from roof to pavement is enveloped in a blanket of water. This sprinkler has no connection with the regular sprinkler system, being entirely independent of it.

The valve used in connection with the dry pipe system has an anti-locking device which holds it open after operation and prevents the sealing of the valve through excessive back pressure. In the riser supplying sprinklers there is a priming connection to prime the valve. This is designed in such a manner as to permit the water column to be renewed if necessary without allowing the air to escape. The following tests of the sprinkler were made upon open joist work construction in a room 15 by 16 feet. The first test was with five pounds pressure, the entire floor surface being rapidly flooded, the overhead joist work and walls being also wet effectively. The strength of precipitation and area of distribution were greatly increased with additional water pressure. One thing brought out by the demonstration was the fact that while the sprinkler thoroughly covered the walls and floor, the ceiling was wet equally as well.

Khaki Cloth.

The Khaki cotton cloth for uniforms for the army and navy of the United States is required to be made from the best long staple, high-grade, American cotton, woven in a workmanlike manner, free from all imperfections, sizing or other foreign substances. To be a diagonal weave, twills to be round and full, and to contain not less than thirty-two ribs or twills to the inch. To contain not less than one hundred and six threads in the warp and not less than fifty-four threads two-ply yarn in the filling to the inch. To sustain a tensile strength of not less than one hundred and thirty pounds to the inch in the warp and not less than ninety pounds to the inch in the filling. To be full twenty-eight inches wide when finished and not less than seven and one-half nor more than eight ounces to the linear yard. To be absolutely fast and to stand the official tests, chemical and otherwise. To contain nothing in the dye to injure the fibre of the material. Shade to be the same as shown in the standard sample. The cloth to be soft, pliable, water-repellant, absolutely smooth and free from streaks and other imperfections of dye, weave and finish.

—The career of Lollardism is unsurpassed in importance by any other phenomenon in English history. Lollardism was the earliest phase of Protestantism in England, as the Catharism of the Albigenses was the earliest phase of Protestantism in France. The tenets of the Cathari were very different from those of the Lollards, but as forces disintegrating to Catholic theology and the Papacy they were quite similar. If the Albigenses had not been exterminated in the thirteenth century, France would probably have become a Protestant country in the sixteenth. If the House of Lancaster had succeeded in exterminating the Lollards, very likely the reformation under the House of Tudor would have stopped where it was left by Henry VIII. But the eastern counties were always the stronghold of Lollardism, and it was among the weavers of Norwich and Worsted and Lynn and Colchester and other such towns that Wyclif found his earliest and staunchest disciples.

DYEING DEPARTMENT.

Dye Recipes for February.

The following recipes appear in the Dyers' Supplement, which is issued each month by the TEXTILE WORLD. The Supplement contains the colored samples, dyed according to recipes given. The selection of samples is carefully made, and it is the aim to show shades which are of especial interest to the dyer, and which the requirements of the market demand. The Dyers' Supplement is a 16 page pamphlet, in convenient form for preservation. Subscription price for the TEXTILE WORLD with the Dyers' Supplement is $3.

Recipe No. 17.

Gray on Cotton Yarn.

Diphenyl Fast Black on 100 lbs. of cotton yarn.

Prepare dye bath with

¼ lb. Diphenyl Fast Black.

(John J. Keller & Co., 104-106 Murray St., New York.)

20 lbs. Common Salt.

Enter yarn at about 180° F., bring to a boil and dye at this temperature for one hour.

One of the features of Diphenyl Fast Black is a fastness to light and also to washing.

Recipe No. 18.

Black on Cotton Yarn.

Immedial Black G on 100 lbs. of cotton yarn.

Prepare dye bath with

10 lbs. Sodium Carbonate.

10 lbs. Sodium Sulphide.

60 lbs. Common Salt.

15 lbs. Immedial Black G.

(Wm. J. Matheson & Co., Ltd., 182 Front St., New York.)

Enter the yarn warm and dye for at least one hour at a temperature which may fluctuate between 120 and 175° F.

Rinse and work in a bath containing

2 lbs. Copper Sulphate.

2 lbs. Potassium Bichromate.

3 lbs. Acetic Acid.

At a temperature of 160 to 175° for ½ hour. Wash and dry.

Immedial Black G gives a clear and intense black which is similar in its properties to Aniline Black. (See recipes 8 and 11, January.)

Recipe No. 19.

Brown on Cotton Hosiery.

Direct Brown No. 11,991 on 100 lbs. of cotton hosiery.

Prepare dye bath with

20 lbs. Common Salt.

4 lbs. Direct Brown No. 11,991.

(O. S. Janney & Co., 8-10 Letitia St., Philadelphia, Pa.)

Enter the dry hosiery at the boil, and continue the dyeing at this temperature for one and one half hours, then wash and dry.

The above receipt would apply to dyeing in an open kettle, in which case the goods should be poled. Even better results are obtained, however, by the use of dyeing machines, in which case the dry hosiery is put into the cold dye bath and the machine started running, gradually raising to the boil, then boiling for one hour and finally washing and finishing.

Direct Brown 11,991 gives an extremely full and rich shade of brown, and possesses great coloring power. It is very soluble in water, and goes on the fibre evenly, producing a shade which is quite fast to light and fairly fast to washing, and is especially adapted for the dyeing of hosiery tans.

Recipe No. 20.

Navy Blue on Cotton Yarn.

Diphenyl Black R C on 100 lbs. of cotton yarn.

Prepare dye bath with

2 lbs. Diphenyl Black R C.

(John J. Keller & Co., 104-106 Murray St., New York.)

25 lbs. Common Salt.

Enter the yarn at 180° F., bring to a boil and dye at this temperature for one hour.

Diphenyl Black R C is recommended for the production of dark blues and not for blacks. It dyes evenly and is recommended for its fastness to light and washing.

Recipe No. 21.

Violet on Mercerized Cotton Yarn.

Chloramine Violet R on 100 lbs. of mercerized cotton yarn.

Prepare dye bath with

2 lbs. Chloramine Violet R.

(Farbenfabriken of Elberfeld Co., 40 Stone St., New York.)

15 lbs. Glauber's Salt.

Enter the yarn at 180° F., bring to a boil and dye at this temperature for one hour.

Chloramine Violet R is remarkably fast to chlorine; and its fastness to alkalies, acids, perspiration and ironing is also good.

It can also be used in calico printing, particularly for padding purposes, and the color discharges fairly well with zinc and tin. (See recipe 176, November, 1899.)

Recipe No. 22.

Orange on Worsted Yarn.

The Amend Mordanting Process on 100 lbs. of worsted yarn (controlled by The Amend Process Co., 205-211 Third Ave., N. Y.). Prepare bath for mordanting with

6 lbs. Acetic Acid (30 per cent.).

Turn one-half hour at 140° F. Lift yarn and add

1 lb. Chromic Acid (previously dissolved in water). Turn for one-half hour, allowing temperature to fall.

Then lift and add to bath

6 lbs. of Bisulphite of Soda.

Bring bath to 140° F. and turn for one-half hour at this temperature.

Wring or pass through hydro-extractor, and dye in a bath of

10 lbs. Chrome Orange, paste.

½ lb. 20% Ammonia.

Enter goods at ordinary temperature, gradually raising same to boiling, and finish the dyeing at this temperature. (See recipe 64, April, 1899.)

Recipe No. 23.

Black on Worsted Yarn.

Alizarine Black R N B on 100 lbs. of worsted yarn.

Prepare dye bath with

10 lbs. Sodium Sulphate.

5 lbs. Acetic Acid.

Heat to 140 to 160° F., and add the dyestuff which has been previously dissolved in boiling water.

6 lbs. of Alizarine Black R N B.

(Wm. J. Matheson & Co., Ltd., 182 Front St., New York.)

Enter the previously scoured material, raise to the boil and dye at this temperature for about one hour, during which time the bath will become nearly exhausted.

Then add

2 lbs. Copper Sulphate.

and work for another 15 to 20 minutes. Wash and dry.

Alizarine Black R N B is particularly useful in the dyeing of hosiery yarn, and is remarkably fast to washing, light, perspiration, rubbing and wearing.

Recipe No. 24.

Violet on Worsted Carpet Yarn.

Acid Violet 4 R on 100 lbs. of worsted carpet yarn.

Prepare dye bath with

20 lbs. Glauber's Salt.

4 lbs. Sulphuric Acid.

3 lbs. Acid Violet 4 R.

(A. Klipstein & Co., 122 Pearl St., New York.)

Enter yarn at 140° F., bring slowly to a boil and dye at this temperature for one hour.

Acid Violet 4 R is an acid dyestuff intended for silk and wool. It goes on the fibre slowly, thus insuring penetration and evenness, and is one of the fastest violets to light known. (See recipe 151, October, 1899.)

Recipe No. 25.

Red on Cotton Yarn.

Trona Red 3 B on 100 lbs. of cotton yarn.

Prepare dye bath with

6 lbs. Trona Red 3 B.

(Farbenfabriken of Elberfeld Co., 40 Stone St., New York.)

Dissolved with 4½ lbs. solid caustic soda (dissolved in water or 11 pints of soda lye 76° Tw.) and a sufficient quantity of boiling water with constant stirring. This hot solution is then added to the dye bath containing

150-200 gallons water.

100-150 lbs. common salt.

Enter the yarn at the boil, shut off steam and work for ¾ hour just under the boiling point, then lift the goods, hydro extract well, but do not rinse, and then work for a short time in a cold solution of 1% Sulphuric Acid (1 lb. of Sulphuric Acid per 10 gallons) and then rinse thoroughly in cold water.

As the bath is not exhausted it may be preserved for further use, when the quantity of color as soda lye should be diminished ⅓.

The quantity of salt added depends upon the amount of liquor removed from the bath with the cloth.

Trona Red 3 B is characterized by its fastness to dilute mineral acids and organic acids, and its great clearness of shade. The shade is turned slightly yellower with warm alkalies, but cold dilute acids restore it.

Trona Red G G may also be dyed on wool, either with acetic acid or dilute cold mineral acids.

Recipe No. 26.

Black on Cotton Yarn.

Direct Black Y on 100 lbs. of cotton yarn.

Prepare the dye bath with

5 lbs. Direct Black Y.

(New York & Boston Dyewood Co., 55 Beekman St., New York.)

30 lbs. Common Salt.

Enter at 180° F., bring to a boil and dye at this temperature for one hour.

Direct Black Y goes on the fibre evenly, is a concentrated type and has a high coloring power.

Recipe No. 27.

Peacock Blue on Worsted Yarn.

Peacock Blue for Wool on 100 lbs. of worsted yarn.

Prepare dye bath with

2 lbs. Peacock Blue for Wool.

(New York & Boston Dyewood Co., 55 Beekman St., New York.)

4 lbs. Sulphuric Acid.

20 lbs. Glauber's Salt.

Enter the yarn at 150° F., bring to a boil and dye at this temperature for one hour. Lift, wash and dry.

To insure an even color it is best not to add the Sulphuric Acid all at once, but in several separate portions during the first half of the operation.

Peacock Blue for Wool is a very concentrated dyestuff, possessing remarkable brilliancy, and will prove of interest to wool dyers.

Recipe No. 28.

Black on Cotton Yarn.

Zambesi Black R on 100 lbs. of cotton yarn.

Prepare dye bath with

6 lbs. of Zambesi Black R.

(Berlin Aniline Works, 73 Front St., New York.)

20 lbs. of Glauber's Salt.

2 lbs. of Soda Crystals.

Dye at a boil for one hour.

In a standing bath 4 lbs. of coloring matter and 5 lbs. of Glauber's Salt will be sufficient.

After well rinsing (best in an acidulated bath) enter the dyeings into the cold diazotizing bath made up as follows.

3 lbs. Nitrite of Soda (previously dissolved).

12 lbs. Hydrochloric Acid.

On further employment of the diazotizing bath, ⅓ the given quantities of Nitrite of Soda will suffice for every 100 lbs. of cotton.

Work for about 15 minutes in this bath, rinse and enter immediately into the cold developing bath made up with

¾ lbs. Meta Toluene Diamine.

1½ lbs. (about) Soda Crystals.

On further employment of the developing bath about ¾ the given quantities will suffice for every 100 lbs. of cotton.

Work there for about 15 minutes, rinse, soap, if desired, and dry.

Zambesi Black R will be found to give a great intensity at a low cost. (See recipe 192, December, 1899).

Recipe No. 29.

Green on Worsted Carpet Yarn.

Kitone Green on 100 lbs. of worsted carpet yarn.

Prepare dye bath with

10 lbs. Glauber's Salt.
4 lbs. Sulphuric Acid.
3 lbs. Kitone Green.
(A. Klipstein & Co., 122 Pearl St., New York.)

Introduce yarn into bath at 175 to 180°, bring to a boil and dye at this temperature for at least one hour with frequent turning.

For a color possessing the same brilliancy, Kitone Green is remarkably fast to alkalies and light, and may be considered one of the best acid greens. (See recipe 77, May, 1899).

Recipe No. 30.

Red on Cotton Yarn.

Direct Oregon Red B on 100 lbs. of cotton yarn.

Prepare dye bath with
20 lbs. Common Salt.
4 lbs. Direct Oregon Red B.
(Anchor Color Manufacturing Co., 462 Cherry St., New York City.)

Enter yarn at 140°, bring to a boil and dye at this temperature for one hour, with sufficient turning to insure evenness.

Direct Oregon Red B is a comparatively fast and cheap red. It goes on the fibre evenly and penetrates well.

It is well adapted for dyeing cotton and wool mixed goods, and the application is the same, only a smaller amount of dyestuff is necessary.

Recipe No. 31.

Black on Cotton Yarn.

Vidal Black D Extra on 100 lbs. of cotton yarn.

Prepare dye bath as follows
25 lbs. Vidal Black D Extra.
(From the Vidal Fixed Aniline Dyes, Ltd., London, Eng., Sykes & Street, 85 Water St., New York, sole American agents.)
5 lbs. Sodium Sulphide.
75 lbs. Common Salt.
3 lbs. Soda Crystals (according to hardness of water.)

Dissolve the dyestuff and Sodium Sulphide in about 10 times their weight of boiling water, then enter the solution in the dye bath, and add the salt and soda, stirring the bath meanwhile. Raise temperature to 140° F., enter the cotton, boil up and dye for one hour. Lift and wash well in two waters. Air for one hour and then fix for fifteen minutes in a bath of
5 lbs. Bichromate of Potash.
5 lbs. Sulphuric Acid.
at a temperature of 130 to 140° F.

Lift, wash very thoroughly, and finish per usual methods.

This black must always be dyed in wooden or iron kettles and never in those of copper, or come in contact with copper during the dyeing operation.

Bichromate of Soda as a fixing agent, in combination with sulphuric acid, gives bluer shades than those obtained with Bichromate of Potash and Sulphuric Acid.

Bluestone can also be used in place of the Bichromate, and where used the black will give a greener shade.

The length of time in the fixing bath is given as 15 minutes, and if the goods are left in longer it will have a tendency to redden the shade.

The dye bath is not exhausted, and must be preserved. For successive baths employ about ½ the proportions used. (See recipe 32, this issue).

Recipe No. 32.

Black on Cotton Yarn.

Vidal Black D on 100 pounds cotton yarn.

Prepare dye bath as follows
18 lbs. Vidal Black D Extra.
(From the Vidal Fixed Aniline Dyes, Ltd., London, Eng., Sykes & Street, 85 Water St., New York, sole American agents.)
5 lbs. Sodium Sulphide.
75 lbs. Common Salt.
3 lbs. Soda Crystals (according to hardness of water.)

Dissolve the dyestuff and Sodium sulphide in about 10 times their weight of boiling water, then enter the solution in the dye bath, and add the salt and soda, stirring the bath meanwhile. Raise temperature to 140° F. Enter the cotton, boil up and dye for one hour. Lift and wash well in two

waters. Air for one hour, and then fix for 15 minutes in a bath of

5 lbs. Bichromate of Potash.
5 lbs. Sulphuric Acid.

at a temperature of 130 to 140° F. Lift, wash very thoroughly and finish per usual methods.

This black must always be dyed in wooden or iron kettles, and never in those of copper, or come in contact with copper during the dyeing operation. Bichromate of Soda as a fixing agent, in combination with Sulphuric Acid, gives bluer shades than those obtained with Bichromate of Potash and Sulphuric Acid. Bluestone can also be used in place of the Bichromate, and where used the black will give a greener shade. The length of time in the fixing bath is given as 15 minutes, and if the goods are left in longer, it will have a tendency to redden the shade. The dye bath is not exhausted, and must be preserved. For successive baths, employ about ½ the proportions used. (See recipe 31, this issue).

Soluble Oil.

The use of this valuable agent in cotton dyeing has extended very rapidly in this country during the past few years, and Bosson & Lane, 36 Central Wharf, Boston, who are among the large manufacturers and dealers in this product, tell us that last year they sold very much more than ever before, and the demand is increasing all the time. It is sometimes known as Turkey Red Oil and Alizarine Assistant.

It ranges in different strengths, the most common being 50 per cent. and 75 per cent. Being a difficult compound to make perfect, there are, of course, various grades, some of which are better than others. The value of soluble oil depends very largely on the percentage of castor oil used in making, or the percentage of fatty acids, and although they are not the only indications of quality, yet they are the features most commonly looked for, and certainly very important.

A simple method of determining the comparative percentage of oil contained in two different makes is the following: Take two graduated wells measuring from 1 or 2 cc. to 250 cc. Into each pour 50 cc. from each sample, and add 50 cc. water. Then add 10 cc. muriatic acid and stir thoroughly with glass rods. Place the wells in a warm place (on radiator or register) and let remain for five or six hours. The oil will come to the top. Measuring this, you can readily calculate the percentage of oil or fatty acids contained in your samples. While the foregoing is far from being a laboratory test, we think it is satisfactory for simply comparative results.

Another method, more accurate, if great care be observed, is the following wax test: Take a small beaker glass and small glass rod. Weigh these together. Put into the glass 300 grains from your sample, and 300 grains of pure beeswax. Then add 5 or 10 cc. of water and muriatic acid. It is not necessary to weigh these latter. Then place glass into a water bath and boil until wax is thoroughly dissolved, and stir contents. Then put in a cool place, leaving the glass rod in the beaker. The fatty acids will combine with the wax, and when cold enough, lift the wax sufficient to pour off the liquid and then dry all remaining moisture by putting beaker in a warm oven, taking care not to burn. When dry, weigh the beaker with contents, including glass rod.

There are numerous other tests, all more or less complicated and suited only for the analyst.

Besides this well-recognized use in coloring cotton as a mordant, it is also largely used to put on the stock in carding cotton, and it is claimed to accomplish most excellent results for this purpose, penetrating the fibre, making it soft and pliable, and putting the stock in splendid condition for carding and spinning.

The Mercerization of Cotton.

Paul Gardner writes in the Berlin Farber Zeitung that various investigations have shown, and the fact is not without interest, that there are not two different sorts of stretching, according to the quality of the cotton, as is asserted in Thomas & Provost's German patent of September 14, 1895. According to this patent it would seem as if besides the stretching discovered by Lowe, there was another which cannot be attained "by the use of such a stretching force as has been hitherto customary with the ordinary machines used for similar purposes in yarn and piece-dyeing, and which can only be produced by a much more powerful force."

If, for example, various kinds of cotton all spun in the same way are mercerized, and experiments made to determine the tension necessary to bring back the cotton to its original length, it will be found that it is practically the same both for Egyptian and for American cotton, and that what difference there is is sometimes one way and sometimes the other. This result is not to be wondered at, in view of the fact that the force necessary to prevent contraction is so great that the slight difference which alone could be exerted by differences in the quality of the cotton is entirely negligible.

We see how shakily the whole hypothesis of the production of silky lustre is built up in the patent, from the circumstance that, the specification notwithstanding, there is only one stretching, and that the production of silky lustre by the stretching depends only upon the cotton, and is unattainable by mere stretching.

The practice of mercerization is increasing fast. Saxony is one of the greatest customers for mercerized yarn. Numbers of new machines for mercerizing continue to be patented, as the matter is so simple that everybody amuses himself by thinking out something new in the way of apparatus. But how badly the conceptions of these constructors are regulated by judgment is shown by a shoal of novelties in machinery for shaking the yarn, as if that could do any good in mercerizing. Take, for example, a machine in which the yarn is alternately stretched and slackened. Such a machine cannot give better yarn than one which gives a steady strain, and must inevitably wear out much faster. It is merely the strong tension that develops the silky lustre, and any other action of the machine is simply secondary. Care must, however, be taken that the points of attachment of the yarn are changed without any relaxation of the tension.

A very essential improvement in yarn mercerization has been achieved by doing away with the use of acid entirely, or to a large extent, by rinsing more effectually from powerful jets with water warmed by steam.

A question which will, sooner or later, assume great importance, is the recovery of the soda lye. At present the first wash-waters are collected and brought back to strength with solid caustic. The water from the first washing vat may be so treated, and that from the second is run to waste. When, however, wash-waters accumulate, or cannot be conveniently strengthened, the question of regenerating the soda comes to the front. Vacuum-evaporating plant is made for the purpose. The first cost of the apparatus is rather high, but it requires little attention, and the working expenses are small. The plant works remuneratively with lyes from 10 deg. B. up.

Some difficulty is experienced in sizing mercerized yarns, as the starch diminishes the silky lustre. Hence sizes should be used having a basis of dextrine. Another improvement consists in gassing the yarn after mercerization. On piece mercerization it need only be observed that it is gaining ground like yarn mercerization. The improvements have been mostly in rinsing arrangements. Mommer, of Barmen, attaches washing vats to the mercerizing troughs and stretching ap-

paratus, so that the whole series of operations comes in an uninterrupted cycle. Haubold, of Chemnitz, has a machine for rinsing with hot water, so as to obviate the use of acid.

The chief question in piece mercerization is the after treatment of the goods. For linings the stuff must be given a tight nip through a finely engraved and heavy calender. The use of ordinary calenders or presses never gives a fine enough finish. Many mercerized articles are, however, now made which must not be subjected to great pressure. For these an ordinary press or calender must suffice.

New Method of Printing Fabrics.

A new method of printing fabrics, as may be understood from the accompanying illustrations, has for its object, to produce by printing certain peculiar effects; and to that end the method consists in printing a color-pattern upon the fabric and obliterating the pattern by removing or preventing the development of varying portions of the color-figures, so that only varying fragments of the color-pattern will appear upon the finished fabric. This may be accomplished by printing a bright color pattern upon the fabric and printing with a resist or a discharge a pattern the figures of which do not register with the figures of the color-pattern, but overlap the figures in an irregular and varying manner. When a resist is used, the fabric is first printed with a pattern in resist and then with a color-pattern, the figures of which do not register with the figures of the resist-pattern, but overlap the figures of the resist-pattern in an irregular and varying manner.

The color-pattern may be printed by applying a color or colors to the fabric, or the pattern may be printed by applying a liquor or liquors to the fabric, which liquor or liquors will develop a color or colors in the subsequent treatment of the fabric. In case the color-pattern is printed by the application of color, then those portions of the color-figures which fall upon the resist will be removed in the subsequent treatment of the fabric or will be decomposed by the chemical action of the resist, and only those portions of the color-figures which did not fall upon the resist will appear upon the finished fabric. In case the color-pattern is printed by the application of color-developing liquor, then the color will not be developed where the liquor falls upon the resist, but will be developed only where the liquor does not strike the resist.

When a discharge is used, the color-pattern is first printed, and then a pattern is printed with a discharge, the figures of which do not register with the figures of the color-pattern, but overlap the figures in a varying manner. The color of the color-pattern will be removed through the action of the discharge, and only those portions of the color-figures which are not struck by the discharge will appear upon the finished fabric.

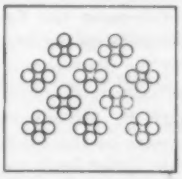


FIG. 2.

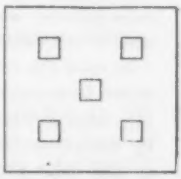


FIG. 1.

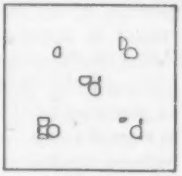


FIG. 3.

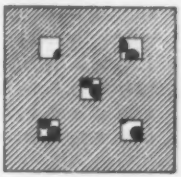


FIG. 4.

The discharge or resist may be a white discharge or resist—that is to say, they may be of such a character that when the fabric is finished it will appear in its original color where the discharge or resist is applied, and only those portions of the color-pattern will appear that did not overlap the discharge or resist. A color discharge or resist may be used, in which case a color will appear upon the finished

fabric where the discharge or resist is applied. The color of the discharge or resist may be the same as one of the colors in the color-pattern, in which case both the color-pattern and the discharge or resist pattern will be obliterated or destroyed and a new pattern formed in which neither of the printed patterns will appear. On the other hand, the discharge or resist color may be and preferably is of a different color from the colors in the color-pattern. In this case the resist or discharge pattern will appear upon the finished fabric, and the figures of the pattern will be colored in a varying manner by the fragments of the color-pattern which fall upon the figures of the resist or discharge pattern.

In case the color of the discharge or resist is a comparatively dark color, the color-pattern may be obliterated by removing only a part of the color, as the color which is substituted for the color removed will prevent any of the color-pattern appearing where the color discharge or resist is applied. Figure 1 indicates a resist or discharge pattern; Fig. 2, a color-pattern, and Figs. 3 and 4 patterns produced by the use of the patterns in Figs. 1 and 2.

Supposing that a pattern similar to that indicated in Fig. 1 is printed in a resist—for instance, the squares indicating the portions of the fabric which are free from resist—and supposing the groups of circles indicated in Fig. 2 to be printed on the fabric in red, for instance, then by reason of the fact that the groups of circles of Fig. 2 do not register with the squares of Fig. 1 varying portions of the circles will fall upon the different squares. When the fabric is finished, those portions of the groups of circles which fall upon the resist will be removed or will not be developed, and only those portions of the circles which fall upon the squares will remain and the pattern shown in Fig. 3 will appear on the fabric, the figures appearing in red. If a color or a color-developing liquor be mixed with the resist, then the portions of the groups of circles which fall upon the resist will be removed as before, but the color of the resist will be substituted and the squares will appear upon a colored ground and the squares will be colored in a varying manner by the portions of the groups of circles which fall on the squares, as indicated in Fig. 4.

Instead of using a resist to obliterate the color-pattern either a white or color discharge may be used, in which case the color-pattern will be printed first and then obliterated by the action of the discharge.

The patterns illustrated are very simple patterns; but it will be apparent from the foregoing that the effects may be greatly varied by using more complex or complicated patterns and that the variations in the effects may be further increased by using a number of colors in the bright-color pattern.

It will be understood that the order in which the steps of the process are performed is immaterial. Thus the color-pattern may be printed first, as when a discharge is used, or the color-pattern may be printed second, as in case a resist is used.

While it is preferred to print the patterns upon the finished fabric, it will be understood that the patterns may be printed on the warp-threads previous to weaving, if desired.

—The supply of merino wool being apparently insufficient for the increasing requirements of the world's trade, the problem arises as to what must be utilized to make good the deficiency, as it is difficult to expect that at these extreme prices the high standard of a 60's top for instance will be universally maintained.

—Drought still continues to play havoc with wool in many districts of New South Wales and Queensland, and again another heavy shortage in quantity is to be anticipated.

—The spindle speed should be low rather than high, as frame spindles are now run.

QUESTIONS AND ANSWERS

Under this head we undertake to answer, free of charge, to the best of our ability, any pertinent inquiry pertaining to textile matters received from any regular subscriber to the TEXTILE WORLD. Questions should be stated as briefly and concisely as possible. Inquiries pertaining to textile processes, machinery, improvements, methods of management, the markets, etc., are especially invited, as well as any legitimate discussion on the views expressed. All inquiries must be accompanied by the name of the person inquiring, not for publication, but as an evidence of good faith.

Cop Dyeing.

Editor Textile World:

Can you give us any information in regard to dyeing yarn on the cop? We would like to know whether it is being successfully done in this country, and if so, by whom, and what machines are used.

Brothers.

Write to Dr. H. Huntington, Wool Exchange Building, New York City, as one who has had more or less experimental experience of value in cop dyeing. We do not know of any machine in this country that is in operation for this purpose. It is our impression that a machine of this kind is in use in Manchester, England, but we are without particulars. It is being done successfully in Germany, on the Obermaier machine, and on the Zittau machine. An improved cop dyeing machine is described and illustrated in the August, 1899, issue of the Textile Manufacturer, Manchester, England, made by O. Venter, Chemnitz, Germany. The conditions under which dyeing is done in this country hardly permit of cop dyeing, as the method is necessarily a slow one, only small quantities being capable of being dyed at one time. Still, it is looked upon as a process greatly reducing the cost of dyeing certain classes of colored yarns, and the prospects seem to be that this method will be greatly improved and enlarged, and a wider range of yarns come under its treatment. In the machine by O. Venter, the dyeing, mordanting, or bleaching liquids are alternately passed through the cops by pressure and suction, and a great advantage is said to be present in this form because of the ability to watch the process, as the trough in which the cops are placed is open at the top and readily accessible.

Standard Length of Hosiery.

Editor Textile World:

Please inform me what the standard length is of foot and leg, or number or size of men's wool socks, and the same regarding children's and women's stockings.

H. A. W.

In a general way, we may answer that men's wool socks measure in inches, for foot, 9½, 10, 10½, 11, 11½; legs, about 14½. For children's ribbed wool hose, the length of foot runs from 5 to 10 (full and half sizes), and the legs about three times the length of the foot. Ladies' wool flat and ribbed, the length of foot is 8½, 9, 9½, 10, and the leg about 27 inches long. These measurements are as near standard as we can get them.

Cotton Spindles in Southern States.

Editor Textile World:

Can you give me any information as to the number of cotton spindles in the Southern States, and how they are distributed, also about how many spindles have been added to mills in the Southern States in the past 12 months, and also in the 12 months previous. I shall very much appreciate this information.

Tuesday.

We can best answer this question by referring to page 37 of the January issue of the Textile World, where we have published our annual report on this matter. Our figures are much more conservative than many that have been published. We do not report mills twice, and try so far as possible to include only those that have gone into production or will do so in the first few months of the coming year. We estimate that the present number of spindles in the Southern States is approximately 5,000,000, including this year's increase, which was 963,384. In 1898 there were added 318,374 spindles to the Southern mills.

Sea Island Cotton Staple.

Editor Textile World:

Will you please let me know the length of staple of the longest Sea Island cotton that ever was marketed?

G. F. P.

All we know concerning the staple of Sea Island cotton, is that the longest we ever saw was 2¾ inches.

Machine for Measuring Silk Tape.

Editor Textile World:

Will you please let us know where we can procure a machine for measuring silk tape, like the enclosed sample (¼-inch wide)?

M. N.

The New England Butt Company, No.

304 Pearl St., Providence, R. I., and W. W. Altemus & Son, 2816 N. 4th St., Philadelphia, make such a machine.

Swart-Murphy Knitting Machine.

Editor Textile World:

Do you know of a knitting machine for silk gloves and mittens known as the Swart-Murphy? I think it is a flat head machine. Can you give me the manufacturer's address?

West.

Taking Out Rust Spots.

Editor Textile World:

Can you give us a recipe for taking rust spots out of woolen goods, in the white, either before or after they are bleached?

H. F.

Rust, or iron spots, are not easily removed. They generally require the aid of an acid. One very good plan that is recommended, is to moisten with acetic acid, allowing the acid to soak well in, then wash with water. Oxalic acid may be used in place of acetic acid, a strong solution in water being used. Sometimes rubbing the spots with tin causes the acid to act more quickly. A mixture of cream of tartar and citric acid, in equal quantities, is a very good agent for removing iron stains from cloths. The spot is moistened with hot water, and the mixture rubbed in. When the stain is removed, the cloth is washed with water and dried. These materials are not recommended, of course, for colored fabrics, where the color might be affected.

Export Goods for Sale.

Editor Textile World:

We have a lot of cotton goods for export trade, and would like to know the names of one or two first-class commission houses who handle such fabrics.

G.

We would suggest the following New York commission houses: Deering, Milliken & Co., 79 Leonard St.; Woodward, Baldwin & Co., 43 Worth St.; and the Cone Export & Commission Co., 89 Worth St.

Embroidering and Printing Flannels.

Editor Textile World:

We notice in your January issue an inquiry, signed "D. W. C.," for information where flannels can be embroidered in the piece and printed. We do this work.

Novelty Textile Printing Co.,
447-449 West 14th St., New York City.

Sulphur for Bleaching.

Editor Textile World:

Will you kindly inform us what is the correct weight of sulphur for fifty pairs of seven-pound blankets?

F. P.

A little experimenting will give our correspondent the correct weight of sulphur for this amount of blankets. We should say that about six pounds of sulphur would be required for 100 pounds in weight of blankets.

Blueing Woolens.

Editor Textile World:

Will you give us a recipe or the coloring matter to be used for blueing blankets, before they are taken out of the scouring machine, and after they are scoured, to take off the yellow cast on them?

T. H.

Cyanole Extra is a good color for making the goods white in the scouring machine. The color can be added direct to the scouring liquid. Perhaps there are other coloring matters that can be used, in which case we should be pleased to hear from those that can furnish the necessary information.

Sheep Industry in Australia.

Editor Textile World:

Can you give me any information as to where I can get reliable accounts concerning the sheep industry of Australia?

C. B.

There are excellent articles on the wool clips of Australia to be found in the Textile World, with maps, May, 1897, May, 1898, and June, 1899. There was a special consular report issued by the State Department, Washington, in 1892, on this subject, that was very full. It was written by U. S. Consul Wallace, Melbourne. The following consular reports might be consulted with advantage: Nos. 123, 131, 140 and 213. These can be found, no doubt, in public libraries.

Instrument for Measuring Length of Staple.

Editor Textile World:

We should like to have the maker's name of the instrument illustrated by you in a late issue, for measuring the length of staple of cotton.

B. B. C.

We do not know who is making this instrument, but the patentee is William E. Stainback, and his address is given by the Patent Office, Washington, as Memphis, Tenn.

Cotton Cleaning — Sharpening Lickerins.

Editor Textile World:

Will you please tell me how to extract leaf and dirt from cotton? Also, how to sharpen the teeth of card lickerins when they are blunt?

J. T.

For cleaning cotton, we would suggest getting a cotton picker, which can be obtained from most any of our advertisers of cotton machinery. In regard to the sharpening of teeth of a card lickerin, we should say that the best way to do would be to buy new card clothing, as it is impossible to sharpen teeth of diamond point card clothing so that it will give satisfactory work. Of course, we understand that our correspondent is not using the revolving flat card, upon which card clothing is not used for lickerins.

New Publications.

Treatise on Mechanical Draft. The high character and educational value of the literature issued by the B. F. Sturtevant Co. of Boston is well evidenced by the following extract from a letter recently received by them. "I am much indebted to you for a gift of a copy of your Treatise on Mechanical Draft. It will be of much aid to me in the preparation of my handbook. Previously when I have needed to consult it, I have made a trip of twenty-five miles to Syracuse to consult the copy in the Syracuse Public Library." This book is an authoritative work of some 400 pages, and deals not only with the problem of mechanical draft, but with all of the important factors concerned in steam boiler practice. Although originally issued for free distribution, the constantly increasing demand for this work has necessitated placing a nominal price of $1.50 upon it. The second revised edition has just been issued.

Draft Without a Chimney. Some months ago the B. F. Sturtevant Co. of Boston, in a neat little pamphlet entitled "Draft Without a Chimney," presented their experience with mechanical draft, and pointed out its salient advantages. The demand for information has necessitated the publication of a third edition, which has just been issued, and may be had upon application.

Cotton Facts, 1899 edition. By Alfred B. Shepperson, Cotton Exchange Building, New York City. Price 75 cents. For ready reference upon all matters relating to the statistics of cotton manufacturing in this and other countries, this book will be found very useful, and its correctness may be relied upon. Particular attention is invited to the review of the cotton situation and to the articles on: Cotton Manufacture in Japan and China; The Progress of Cotton Manufacture Since 1889 in Europe, the United States and India; The Advantages of the Southern Mills; and Improvements in the Baling of American Cotton.

Bosson & Lane, Boston, Mass., have issued for 1900 an attractive calendar, to be hung on the wall. The calendar is enlivened by a colored portrait of a Florentine girl. It is well worth securing and giving a conspicuous place in the office.

Calendar for 1900. A very attractive calendar, to be hung in the office, has been issued by D. R. Kenyon & Son, manufacturers of woolen machinery, Raritan, N. J., with an illustration in colors representing "The Bride and the Fortune Teller." This concern manufactures tentering and drying machines (pipe system or hot air), fulling mills, cloth washers, dyeing machines, Blamire lappers, Chinchilla machines, friction clutches, etc.

Knitting Machines. Lamb Mfg. Co. We have received from the Lamb Mfg. Co., Chicopee Falls, Mass., their new catalogue and price list, in which is presented their full line of knitting machines. It is amply illustrated, and we think many manufacturers will find new machines which have not before been brought to their notice. There has been, the last few years, a large demand on the part of the public for fashioned goods, and many establishments have been started up to meet the wants of this trade. The Lamb machine, embodying the Lamb principle, is really a distinct branch of the art, and for many classes of goods is still the only type of machine that can be successfully employed. Their Catalogue thus becomes a work of unusual interest, and should be in the hands of every knitting manufacturer and knitter for reference. Besides the various types of the well-known Lamb hand machine, we note a new style of power machine, the Tuttle special automatic, a new power cardigan jacket and sweater machine, body frames, looping and seaming machines, etc. The catalogue also states that a large reduction has been made in the former price list.

Appleton's Popular Science Monthly. New York: D. Appleton & Company. Price $5 per year. The February number of this magazine contains a number of especially interesting articles. Among them may be mentioned the following: South Sea Bubbles in Science, by Prof. J. Trowbridge. This article is a warning against fakes in science, which have been so numerous and disastrous of recent years. Is the Christian Religion Declining? By C. A. Briggs, whose recent expulsion from the Presbyterian and immediate entrance into the Episcopal church attracted much attention. Decline of Criminal Jurisprudence in America, by a member of the New York bar. An extremely interesting article relates to the advances that have been made in Geological Science during the 19th century. Alaska and the Klondike furnishes an instructive article from Prof. A. Heilprin.

Central Station Electricity Supply. By Albert Gay and C. H. Yeaman. New York: The Macmillan Company. Price $3. The subject of electric lighting already possesses an extensive literature. This work will be a welcome addition to the practical side of the subject. The intention of the authors of this work has been to take up in a general way the points which arise in central station prac-

tice, as distinct from electric lighting as such, and this object has been kept in view throughout. The limitations of space in such a work has forbid more than a discussion of general principles, and a brief mention of the devices that can be introduced to meet the essential conditions of a safe, efficient and economical generation and distribution of energy. The subjects of a few of the chapters will give an idea of the character of the work, as Electricity Supply and Electricity Works; Direct Systems of Supply; Electrical Equipment; Switch Gear and Regulating Appliances; Mains and Services; and Street Lighting.

Outlines of Industrial Chemistry. By Frank H. Thorp. New York: The Macmillan Company. Price $3.50. This work is intended as a text book for students, and is written by the instructor in industrial chemistry in the Massachusetts Institute of Technology. Its object is to furnish a preliminary course in industrial chemistry, which may serve as the groundwork for a more extended course, if desired. The writer has endeavored to describe briefly, within the limits of one moderate sized volume, of 540 pages, the more important industrial chemical processes, but omitting matters of detail, which properly belong to the larger handbooks. In the selection and order of arrangement of the several subjects, the author has been influenced by his professional work in the instruction of students.

Industrial News.

A Great Chance.

A large department store in Chicago is desirous of securing the services of a high class merchant of wide and mature buying experience principally in dry goods and kindred lines to supervise the buyers of various departments.

This position is open only to a man of clear record and of far more than average ability. As the man qualified for this position is probably already in business either for himself or in a like responsible position, he may not care to answer this advertisement over his own signature, and although we will treat any replies as strictly confidential, he can write us omitting his signature and naming a box number or other address whereby we can arrange a personal interview, if desired.

State in detail experience, present occupation, ideas of salary, age, etc., etc. Address, Drygoods, P. O. Drawer 146, Chicago, Ill.

B. & L. Anti-Chlorine.

The use of this product is very largely increasing for bleaching cotton. Bosson & Lane of 36 Central Wharf, Boston, report that their trade in anti-chlorine last year exceeded all previous records, and it still seems to be growing. In order to distinguish their product from all others, they give it the brand "B. & L. Anti-Chlorine." The advantages claimed for it are that there is no acid, no soap, required, and that the process is perfectly simple and the yarn is not in any way injured in strength.

—The Link-Belt Machinery Co., Chicago, Ill., have been very busy during the past year, and among their recent orders from the textile trade may be mentioned the following: A 5 H. P. rope drive from the Barron Woolen Mills Co., Barron, Wis.; 30 H. P. rope drive from the Chicago Corset Co., Aurora, Ill.; and from the Amazon Knitting Co., Muskegon, Mich., a 20 H. P. rope drive, together with complete equipment of pulleys, shafting, friction clutches, gearing, etc.

—The Hoboken Mill of Wright's Health Underwear Company is very busy this season in turning out some fine work, under the superintendency of E. J. Tator.

—An instructive illustration of the results attending the use of mechanical draft is presented in the experience of the Utica Portland Cement Co., of Utica, Illinois. The change was recently made from a chimney to a Sturtevant fan as a means of draft production. They say, "We formerly used five boilers and had trouble to keep up steam with a good grade of coal. We now use four boilers, and coal costing us 35 cents per ton less, and have no trouble in keeping a good head of steam."

—One of the most important problems presented in the equipment of the repair ship Vulcan, described in a recent issue of the Engineering Magazine, was that of maintaining an endurable atmosphere in the forge shop and foundry, which were located between decks. The problem was solved by introducing a large steam fan and system of piping. This installation, like that in connection with the foundry equipment, was made by the B. F. Sturtevant Co. of Boston. The fan was applied to exhaust the smoke from the forge hoods, and coincidentally the hot air from the forge shop. It was stated by the officers in charge that "this arrangement proved of inestimable value."

—The O. J. Childs Co. has succeeded the Utica Extinguisher Co. as manufacturers of the Utica fire extinguisher, 48 Liberty St., Utica, N. Y. Mr. Childs has been manager of the business almost from its conception, and it is largely due to him that this apparatus has been so largely introduced, although, of course, its own merit has helped it along wonderfully. The New York State Board of Fire Underwriters have recently published the names of four hand fire extinguishers which they accept as standards in readjusting rates for fire insurance; viz., the Utica, Babcock, Underwriters and Rex.

Installing Telephones.

F. O. Plummer, 620 Atlantic Ave., Boston, is busy on mill and factory work. Among orders recently completed is the installation of a telephone system in Rice & Hutchins' factory at Marlboro, and also a system for the Pfister & Vogel Leather Co. in their new premises on South St., Boston. Mills which are not equipped with telephone systems perhaps do not appreciate what needless trouble they are putting themselves to, but we have yet to find a concern that has once installed a system who would take it out if it cost twice as much. In a large plant it is more than a luxury. It really becomes a business necessity.

—The Rusden Machine Company are extremely busy, and have been working over time for the past six months, and have orders in hand sufficient to keep their place running for over six months. They report business in the bleaching, dyeing and finishing line to be larger than has ever been known before.

—Massachusetts, East Blackstone. Alfred H. Lange, formerly manager of the Blackstone Spinning & Dyeing Co., has bought out the interests of his former partners, and will conduct the business alone hereafter under the name of the Lange Spinning & Dyeing Mills.

—The little book entitled "The Art of Finishing" published by Birch Bros., Somerville, Mass. (price 20 cts.), has found its way into all corners of this country where there are textile mills, and also to more remote parts of the world. In a letter recently received from a finisher in a mill in Bomenfels, New South Wales, Australia, the writer speaks very appreciatively of the booklet. Birch Bros. are very busy just now and are installing a larger engine to give them more power, which is needed to handle their increasing business.

—W. M. Ostrander, 1215 Filbert Street, Philadelphia, Pa., makes a business of selling textile plants, procuring additional capital, and negotiating partnerships. He has the necessary equipment, facilities and ability for properly handling any business in his line. To any one requiring such services as he offers we commend him as a man thoroughly understanding his work and always watchful of his clients' interests.

—T. G. Williamson of Asheville, N. C., arrived at the New Bedford Textile School last week to take the cotton yarn mill superintendents' course.

—During the month of December last, the Draper Company, Hopedale, Mass., shipped 1355 Northrop looms.

Telephone System in New Bedford Textile School.

The trustees of the New Bedford Textile School have adopted a system of Swedish mill telephones for installation in the school. These telephones will be installed in all the machinery rooms and also in the general office and in the managing director's office, so that any department can be called up from the office or any department can call up any other department. The telephones will be connected with metallic circuits throughout and more than one pair of telephones may be connected and independent conversations carried on simultaneously if desired. The system utilized in the school is that of F. O. Plummer, 620 Atlantic Avenue, Boston, Mass., who has donated the entire outfit.

"Suggestions."

Under the above heading, the Boston Belting Co. reminds manufacturers of the many branches of its business which are of interest to them. The booklet also contains some interesting facts about the rubber industry, and is illustrated by attractive sketches. The Boston Belting Co. is the oldest concern engaged in the manufacture of mechanical rubber goods, and its processes and patents have been pioneers. Besides its brands of rubber belting and other mill supplies, such as rubber hose, fire hose, packing, tubing, etc., they have made a specialty of rubber covered rollers, such as are used in textile mills to a very large extent. They were the first to do this class of work and the process was patented in 1866 by James Bennett Forsyth, their present general manager, and since that time they have covered over 80,000 large sized rollers and several hundred thousand small rollers. During the life of the patent they were the exclusive manufacturers of rubber covered rollers and adapted them for the various purposes for which they were especially useful in bleacheries, print and dye works, cotton and woolen mills, wool washing establishments, etc. The large business established under the life of the patent has been continued since then by the maintenance and constant improvement of their goods, which are made to withstand most severe conditions of service. The main offices of the company are at 256-258 Devonshire St., Boston, and in New York and Buffalo, and their distributing agencies are located in the principal cities in this country and Europe.

—Fred W. Hadley, son of the treasurer of the Hadley People's Cotton Mill, Siler City, N. C., will join the New Bedford Textile School at the beginning of the next term on January 29th.

—Probably textile manufacturers appreciate more than any other class the value of steadily running belts instead of the irregular speed resulting from slipping of the belts. Textile users of Cling-Surface are constantly reporting entire cure of slipping after its use, with pliable, well preserved belts.

Frederick E. Clarke.

At the request of a large number of friends of the late Frederick E. Clarke, Lawrence, Mass., president of the New England Cotton Manufacturers' Association, a memorial volume of him is about to be compiled, by J. C. Crombie, of Lawrence, Mass., who will have the cooperation of the various organizations with which Mr. Clarke was identified. The book will be handsomely bound, with deckle edge and gilt top, and will contain about 150 pages. The edition will be limited to the number of copies ordered in advance, and will probably not exceed $1 per volume in cost. The book will contain a memoir by the Hon. R. H. Tewksbury, memorial sermon by the Rev. Geo. H. Young, abstract from sermon of the Rt. Rev. William Lawrence, D. D., tribute by C. J. H. Woodbury, addresses by C. A. De Courcy, J. C. Crombie, B. E. Donigan and others. In addition will be embodied resolutions adopted, press notices, etc., together with addresses delivered by Mr. Clarke on different occasions. Those desiring this memoir can write to J. C. Crombie, Lawrence, Mass., to this effect.

—The Saco and Pettee Machine Works of Newton Upper Falls have contracted with F. O. Plummer of No. 620 Atlantic Ave., Boston, to install a complete telephone system through their entire works.

Mr. Plummer makes a specialty of fitting mills and large manufacturing concerns with telephone services and does a high grade of work.

—The Cling-Surface Mfg. Co. of Buffalo, N. Y., report that they have established a branch office in New York City, 205 Postal Building, 253 Broadway, to facilitate the supplying of Cling-Surface to their increasing trade in that vicinity.

—The Albany & Hudson Railway & Power Co. have placed the contract with The Berlin Iron Bridge Co., of East Berlin, Conn., for their power house and the several bridges required for the extension of their line from Albany to Hudson, N. Y. The line will require nine spans of plate girder bridges, varying in length from 30 ft. to 65 ft., with a viaduct over the tracks of the B. & A. R. R. and the N. Y. C. & H. R. R. R. This viaduct will require something over 1000 tons, it being 175 ft. pin-connected, and that over the N. Y. C. & H. R. R. R. being over 200 ft. in length. The work is to be completed in the early spring.

Rock Maple Logs.

Birch Bros., Somerville, Mass., have arranged to have logs suitable for bleacheries, etc., selected and cut by experienced woodsmen and shipped direct from the lumber region to their customers. Every log is thoroughly guaranteed, and with the connections they have established, they believe they can quote bottom prices on carloads delivered at the mill. This is the time for placing such orders, as logs cut in the winter are the best and last longer than those cut at any other time. They invite correspondence.

Satisfied Customers.

The following letters recently received by F. O. Plummer, 620 Atlantic Ave., Boston, refer to mill telephone systems recently installed by him, which have been in operation long enough to enable a valuable opinion being given:

A. H. Rice & Co., Silk Braid, Mohair Braid, Sewing Silks, Machine Twist.
Pittsfield, Mass., Jan. 26, 1900.

Mr. F. O. Plummer, Boston, Mass.,

Gentlemen: Yours of Jan. 25th received. We have to say that the telephones you installed for us are giving entire satisfaction and we find them a great convenience. They work better in our noisy rooms than we were afraid they would do.

Yours truly,
A. H. Rice & Co.

Social Manufacturing Company, Social Mill, Globe Mill, Nourse Mill.
Woonsocket, R. I., Jan. 26, 1900.

Mr. F. O. Plummer, Boston, Mass.,

Dear Sir: In reply to yours of the 25th inst., would say that the system of telephones recently installed by you in our mills is working satisfactorily and we are well pleased with the same.

Yours truly,
William A. Robinson, Asst. Supt.

The American Appraisal Co.

We desire to call the particular attention of our readers to the advertisement of The American Appraisal Company, of Milwaukee, Wisconsin, and feel that an investigation by textile manufacturers generally of the business proposition offered by this concern will prove advantageous.

While the idea of appraisal is by no means new, it is certain that until this time no reliable concern has made a specialty of this work, nor has it ever before been brought to the point where a complete, thorough and correct record and valuation could be obtained through the services of a reliable and disinterested corporation acting as a third party.

The appraisal, as made by this company, consists of an itemized record, showing each and every item in the construction of the various buildings composing the manufacturing plant from the cost and size of excavations for foundations and cellars to the amount and value of nails and hardware used in the buildings. All stone, brick, iron and woodwork, hardware, glass, etc., is specified piece by piece, and attached to each item is the cost of same at present market rates. To all this is added the cost of labor, etc., necessary for the construction of buildings.

In addition, the appraisal specifies boilers, engines, pumps, machinery of every kind, shafting, belting, pulleys, pipe and fittings, sprinkler system, electric light plant, tools and miscellaneous articles of every kind whatsoever contained in and about the plant are included with proper description and price. The work is classified according to buildings, departments, floors, etc., and so arranged that additions or deductions to conform with changes in the plant can be easily made at any time.

All this is supplemented by complete blue print plans made by architects and draughtsmen in the employ of this company, and show elevations, cross sections and floor plans, with location of machinery, shafting, etc., corresponding with the appraisal.

As a means for the economic distribution of insurance and the proper proof and collection of loss in the event of fire, the value of such a record cannot be over estimated, and especially is this true when furnished by a disinterested third party whose standing and reliability is unquestioned.

It would seem as if every textile manufacturer throughout the United States would find this appraisal of much value on many occasions. Many of the best known manufacturing concerns are at present customers of The American Appraisal Company, and have their record in constant use, and we suggest that our readers ask for further particulars as regards the work.

The American Appraisal Company has an Eastern branch at No. 804 Park Row Building, New York, and all inquiries will be gladly given prompt attention.

Removed to Larger Quarters.

The Berlin Aniline Works have been doing such a large business from their Philadelphia office that their former quarters were inadequate, and they have recently removed to 122 Walnut St., where they have larger premises for handling their increasing business.

Foreign Trade with the East.

Since our Philippine campaign has turned the attention of the whole country to the East, manufacturers have realized more than ever the great opportunities for the development of trade in this direction, not only with the Philippines, but with Hawaii, Japan and China. Undoubtedly, the development of American trade in this direction is going to be one of the features of commerce in the next decade. Textile manufacturers are among those to whom it offers a particularly good opening. Many are considering the question in the abstract, but a new advertiser in this month's issue of the Textile World, Mr. M. Marks, solicits correspondence with the idea of taking definite steps to reach this market, and those who may be interested in this matter might find it to their advantage to correspond with him.

—August Neubeck & Company, makers of thermometers, hydrometers, etc., are located at 92 Fulton St., instead of 48 East 23d St., New York, as given in these columns in our last month's issue.

MILL NEWS.

Cotton.

New Mills.

—*Alabama, Florence. The new Ashcraft Cotton Mills, about which we gave detailed report in previous issue, and who expect to begin operations about March, have appointed Cyrus W. Ashcraft, president; John T. Ashcraft, vice-president; S. S. Broadus, treasurer, and E. Ashcraft, secretary and general manager.

—*Alabama, Fort Payne. Gen. C. M. Shelley and associates have made a proposition to the citizens of this place in the interest of erecting a cotton mill, that they take $10,000 worth of stock in the new plant. This has been accepted and also site and building proffered.

—*Alabama, Huntsville. The new plant of the Merrimack Mfg. Co. is almost ready for the installation of the machinery, the roof having been completed.

—*Alabama, Mobile. The Barker Cotton Mill Company, which was recently organized, has elected George G. Barker, president; Francis L. Hills, vice-president, secretary and treasurer, and F. S. Mosher, manager. The plant may ultimately cost about $400,000, and be equipped with 20,000 spindles, for manufacturing coarse cotton goods. Sufficient money will be collected for the work to be well started and later the full amount of subscriptions will be called for.

—*Alabama, Sylacauga. The corner stone of the new McDonald Cotton Mills, which will be 400x100 feet was laid Dec. 22d. They have appointed the following officers; President, Dr. J. E. Pearson; vice-President, Capt. John B. McDonald; Treasurer, Maj. R. A. Bacon; Secretary, E. W. Ledbetter; and Superintendent, Henry Smith. We reported on equipment in a previous issue

—Georgia, Atlanta. The new mill to be erected here by the Geo. W. Scott Investment Co., contract for erection and equipment of which has been let to Geo. A. Gray, of Gastonia, N. C., will be known as the Ingleside Mills. About 10,000 spindles will be installed and a large number of looms.

—*Georgia, Columbus. The Columbus Mfg. Co., which we reported in a previous issue would commence operations with 10,000 spindles, have decided to complete the mill building with capacity of 20,000 spindles as originally intended. It is now expected that the plant will be fully completed about the 1st of April.

—*Georgia, La Grange. $75,000 is said to have been subscribed toward the new cotton mill here. This probably refers to the project previously mentioned in which the Mutual Aid Society was making efforts to erect a plant to be operated by colored help.

—*Georgia, Louisville. The new cotton mill at this place, about which we have made detailed mention in a previous issue, will be known as the Jefferson County Mfg. Company.

—*Georgia, McRae. The new cotton mill proposed at this place by E. F. McRae will be incorporated as the McRae Cotton Mills Co., with capital stock of $100,000. We reported in a previous issue that $35,000 had already been subscribed toward the project. The plant will contain 5000 spindles and 200 looms.

—*Georgia, Moultrie. In regard to the new mill at this place. it is reported that $54,000 has already been subscribed, $25,000 being offered by W. C. Vereen. Outside capitalists have agreed to take $75,000 worth of stock, if Moultrie will furnish a like amount.

—*Georgia, Thomaston. The Thomaston Cotton Mills, about which we have given particulars in a previous issue, have nearly completed erection of building.

—Georgia, Union Point. The Union Point Manufacturing Co., now operating an extensive knitting mill, will erect a yarn plant, with 2500 spindles.

—*Indiana, Madison. The R. Johnson Yarn & Cordage Mills, about which we gave details previously, expect to begin production of goods about March 1st, 1900.

—*Kansas, Coffeyville. Operations have already commenced in the new cotton mill built here. Twine is the manufactured product, 2000 lbs. per day to be capacity, when in full working order. Employment is given to about 45 hands.

—Louisiana, New Orleans. We have been informed by John L. Schroeder, 10 St. Charles St., that he has secured the necessary capital for a yarn mill, and is now in the market for second-hand machinery to make hosiery yarns and twines, carpet warps, etc., and invites estimates for such, f. o. b. New Orleans. Mr. Schroeder formerly operated the mill at Washington, La.

—*Massachusetts, Fall River. The new weave shed being constructed at Tiverton, R. I., by the Bourne Mills, will be considerably enlarged, original plans being altered, covering additional space of 5000 more feet. We gave detail of mill in a previous issue.

—*Massachusetts, Holliston. The Holliston Mills will now be operated under the name of the Holliston Cotton Mills Co. Owing to delay in receiving the machinery, it will be impossible to begin operations Jan. 1st, as previously reported. They will make cotton yarn.

—*Mississippi, Greenville. Application has been made for a charter by the Valley Cotton Mills, recently organized with capital of $100,000 by J. W. Harrow, J. A. Crawford, W. A. Jewell, J. D. Smith and others. They ask for privilege of increasing to $500,000.

—*Mississippi, Hattiesburg. The Hattiesburg Cotton Mill Co. has been organized with capital stock of $500,000. W. C. Bennett, J. S. Turner and P. E. Blalock are among those interested.

—*Mississippi, Jackson. We have been informed by Garrard Harris, president of the Business League here, that contracts for the machinery for new cotton mill, about which we gave report in a previous issue, will be placed about April or May, if they are successful in getting capital stock subscribed. They expect to raise $100,000.

—*Mississppi, Rosedale. It is reported that $25,000 has already been subscribed toward the $50,000 cotton mill proposed at this place, in which we mentioned in previous issue that A. Y. Scott was interested.

—*Mississippi, Tupelo. The new cotton plant at this place will be known as the Tupelo Cotton Factory, with L. D. Hinds, president; John Clark, vice-president, and J. M. Thomas, secretary-treasurer. It is reported that land has been purchased and that contracts for the work will soon be placed.

—*Mississippi, Winona. Theo. Mendelsohn informs us that $80,000 has already been subscribed toward the new $100,000 cotton mill to be erected here. As soon as the issue of the stock is completed, they will commence building.

—New Jersey, Keyport. It is expected that the new thread mill established at this place by Edward Currie will begin operations in about a month, employing about 17 hands.

—*New York, Perry. The new yarn mill which is being built by the Perry Knitting Co. will probably be ready to start up about April 1. It will be equipped with Mason cards and mules.

—North Carolina, Burlington. Thomas L. Holt is desirous of corresponding with parties having second-hand machinery for sale, such as lappers, carding machinery, spinning reels and cone winders. He wants the prices on a complete outfit for a 2000 spindle yarn mill.

—*North Carolina, Charlotte. The machinery in the Magnolia Webbing Co.'s Mill, A. C. Summerville, proprietor, has been sold. The plant, which was formerly operated in manufacturing narrow fabrics, back bands, etc., will be converted into a spinning mill and 3000 spindles installed, for making fine yarn.

—*North Carolina, Gastonia. The new plant at this place in which Geo. A. Gray and John F. Love are interested, has been organized as the Loray Mills, with capital stock of $1,000,000. The mill, which will be 5 stories, 504 by 130 feet, will be equipped with 50,000 spindles and 1600 looms. The Flynt Building and Construction Co., Palmer, Mass., have been awarded contract for erection of buildings.

—*North Carolina, Gastonia. The new mill at this place in which we reported that G. W. Ragan was interested, will be incorporated under the name of The Arlington Mills and will be capitalized at $125,000. Site has been purchased and work will start at once on erection of plant, which will contain about 10,000 spindles. G. W. Ragan, L. L. Jenkins, J. D. Moore, A. A. McLean and C. E. Adams have been appointed directors.

—North Carolina, Goldsboro. It is reported that the Parker Cotton Co., W. K. Parker, having the matter in charge, are contemplating the erection of a 5,000 spindle mill here for manufacturing hosiery yarns.

—*North Carolina, Graham. The Scott-Mebane Mfg. Co. has been incorporated, with capital stock of $45,000, by L. Banks Holt, H. W. Scott and James K. Mebane, for manufacturing thread, warps, overalls, etc.

—North Carolina, Henderson. It is reported that work will soon be started on the erection of a new cotton mill here, for manufacturing fine hosiery yarns.

—North Carolina, Henrietta. A site has been purchased about two miles from here, called Tumbling Shoals, on which a $50,000 spindle mill will be erected. Col. Frank Coxe (Asheville), Dr. T. B. Lovelace (Rutherford), and R. R. Hayes are interested in the company, which has not yet been incorporated.

—*North Carolina, Jerusalem. The machinery for the new Cooleemee Cotton Mills, of Cooleemee Falls, near this place, of which George A. Mebane, of Greensboro, is treasurer, will be shipped in January. The main building of the plant, which they propose equipping with 25,000 spindles, as previously reported, and 800 looms, will be 104 by 422 feet. Messrs. Willard & Hampton, of Spartanburg, S. C., were awarded contract for erection of plant.

—*North Carolina, Kings Mountain. The Cora Cotton Mills, which have been incorporated with capital stock of $100,000, F. Dilling, president; O. G. Falls, treasurer, and J. M. Williams, superintendent, expect to begin operations in July, 1900. 5000 spindles will be installed for manu-

facturing coarse yarns, skeins and warps, Nos. 6s to 16s. Plant is to be run by steam power. W. M. & F. W. Sharples, selling agents.

—*North Carolina, Kings Mountain. The new cotton mill, which will be erected in the spring by Mauney Bros., will be known as the Bonnie Cotton Mill, with capital stock of $100,000. The following is list of officers: J. S. Mauney, president; M. M. Carpenter, vice-president; W. A. Mauney, secretary, treasurer and general manager.

—*North Carolina, Laurinburg. Work has commenced on the erection of Mill No. 2 of the Scotland Cotton Mill. The contract for the machinery, which will consist of 5000 spindles, has been let.

—*North Carolina, Lexington. Further information in regard to the proposed cotton mill at this place is that the plant will have a capital stock of $200,000, $75,000 of which has already been raised. Geo. W. Montcastle, J. F. Hargrave and D. H. Hinkle are among those interested.

—*North Carolina, Mooresville. It is now rumored that the new cotton mills at this place will be built by the Mooresville Cotton Mills, of which J. E. Sherrill is president, and to be known as Mill No. 2. The equipment will probably consist of 5000 spindles, for manufacturing same class of goods now made at No. 1 mill. The capital stock for the new enterprise has all been subscribed.

—North Carolina, Taylorsville. E. L. Hedrick, of this place is interested in the project for erection of a cotton mill here, with equipment of about 2,000 spindles and 50 looms, for manufacturing 4x4 sheeting. Negotiations will probably be made with parties to put in the machinery as payment for stock in company.

—Pennsylvania, Philadelphia. It is reported that the Moss Rose Mfg. Co., 3d and Huntingdon Sts., are to erect a new plant, 50 by 200 feet; 4 stories.

—*Pennsylvania, Reading. The Narrow Fabric Company has been chartered here with capital stock of $20,000, G. B. Stevens, president, and Henry F. Kanter, treasurer. The concern will manufacture laces, braids, tapes, etc., and will probably start in about two months, giving employment to about 100 hands.

—*Pennsylvania, Wilkesbarre. The Board of trade, which is making strenuous efforts to locate a large cotton mill here, have already secured $175,000 and their success now seems probable.

—*Rhode Island, Pawtucket. The new plant of the Hope Webbing Co. has been completed. The equipment of the plant is not yet complete. Thirty-two new narrow fabric looms, patented by Oscar A. Steere, the superintendent, have been placed and 40 more are yet to be installed.

—*Rhode Island, Woonsocket. The Morrill Knitting Company has been incorporated with a capital of $100,000. Edward H. Rathbun, Mark Hough and Frank A. Morrill, incorporators.

—Rhode Island, Providence. The Elite Manufacturing Company has been incorporated here, with a capital of $50,000, to manufacture and deal in cotton, woolen and silk goods. The incorporators are: J. Ogden, of Fall River, Mass.; J. Ashworth, of Providence; J. Ashworth, of Manville.

—*South Carolina, Anderson. The plant of the Cox Yarn Co., upon which work has already been started by C. M. Guest, will be 56 by 177 feet. It is probable that the plant will be enlarged in the near future. As previously reported plant will contain 5000 spindles.

—South Carolina, Camden. We have been informed by R. W. Mitcham, who is interested in the De Kalb Cotton Mills, that work will be started on building early in the spring on a plant to be equipped with 10,000 spindles, 10,000 more to be installed later, and 500 looms. Plain converters goods are to be manufactured. About 200 hands will be given employment. Steam power.

—South Carolina, Chester. A company has been organized here with capital stock of $100,000 to erect another cotton mill. Site for buildings has been purchased. George W. Gray, of Gastonia, is president and Thomas H. White, of Chester, secretary and treasurer.

—*South Carolina, Dillon. The Dillon Cotton Mills, which have been incorporated with a capital of $150,000, are now having plans made for the new plant. Equipment will consist of 10,000 spindles and 350 looms, for manufacturing sheetings and drills. J. W. Dillon, H. P. Price, Charles Warren Davis (Augusta, Ga.) and A. B. Series are among the incorporators.

—South Carolina, Gaffney. The Limestone Manufacturing Co. has been incorporated here with capital stock of $200,000 by A. N. Wood, J. A. Carroll, J. Q. Little, E. R. Cash, R. A. Jones and L. Baker, for building and operating a cotton factory.

—*South Carolina, Greenville. J. I. Westervelt, president and treasurer of the Brandon Mills, which have been incorporated with a capital of $300,000, informs us that 56/60 sheetings, 4 yd. goods will be manufactured. The plant, which will have 10,000 spindles and 300 looms, instead of 12,000 spindles and same looms, as reported by us in a previous issue, will be started about September, 1900, giving employment to about 200 hands. Work on foundation will be started in February. Woodward, Baldwin & Co. will sell the goods.

—*South Carolina, Greenville. The incorporators of the new mill proposed for this place, among whom are Ellison A. Smyth (Pelzer), Lewis M. Parker and H. J. Haynsworth (Greenville) and Thomas F. Parker (Philadelphia), have applied for a charter under name of the Monaghan Cotton Mills, with capital of $500,000 and equipment of 25,000 spindles.

—South Carolina, Honeapath. A new cotton mill, which will have a capital stock of $300,000, is projected for this place. J. A. Brock, of Anderson, has been elected president.

—South Carolina, Lolo. Work has commenced on erection of the new plant of the Valley Falls Mfg. Co., recently organized, with capital stock of $100,000 and S. W. Scruggs, president and treasurer.

—*South Carolina, Spartanburg. Jno. A. Law, who is interested in the project of new cotton mill here, informs us that the plant, which will be incorporated with $200,000 capital, will be equipped with 10,000 spindles and 300 looms, and operated by steam. The company is not

yet organized. Have not yet decided what class of goods will be manufactured. It is expected that work on foundation will be started in March, with prospect of having plant ready for next crop. Employment will be given to about 300 hands.

—*South Carolina, Union. The plant of the Monarch Cotton Mills, about which we made previous mention, will be equipped with 10,000 spindles for manufacturing cotton cloth. Lockwood, Greene & Co., of Boston, are the architects and engineers. Deering, Milliken & Co. will sell the goods. Ground has not yet been broken.

—*Tennessee, Jackson. The cotton mill for this place will be built by the Bemis Bros. Bag Co. of 89 State St., Boston. Lockwood, Greene & Co. are the engineers in charge. The plant will have about 20,000 spindles and looms for making cotton bags. Foundation will be started as soon as possible, and it is expected that the plant will get into production the latter part of the year, giving employment to about 300 hands. Steam power. The county court has appropriated $6000 to purchase and donate a site.

—Tennessee, Memphis. Judge J. T. Latham, president of the Industrial League, is interested in the project of locating a large mill concern here. It is said that if $50,000 subscription is raised toward the bonds of the company, that the plant, which will give employment to about 600 men, is assured. Funds to the amount of $35,000 have already been secured for the enterprise.

—Texas, LaGrange. G. A. Heilig, chairman of the committee appointed to solicit subscriptions for the new cotton mill here, informs us that as soon as enough stock is signed, that work will commence on the structure. Domestics, sheetings and shirtings will be manufactured. About 200 hands will be given employment.

—*Texas, Mt. Vernon. Propositions are now being made for the organization of the Mt. Vernon Cotton Mills Co. to erect mill in which we previously reported that H. N. G. Bentley was interested. They are now receiving estimates on cost of $35,000, $50,000 and $75,000 plant and all necessary equipment for producing 10 to 40 yarns.

—*Texas, Rockdale. At a meeting held recently for purpose of erecting a $50,000, plant, nearly one-half the sum desired was subscribed. Among those interested are: Judge J. S. Perry, who was appointed chairman of the meeting; J. E. Longmoor, likewise secretary and E. M. Scarborough.

Enlargements and Improvements.

—*Alabama, Anniston. Pratt & Yates, who have leased the plant of the Anniston Bag Co., may erect a new building and bleachery. Previously all bleaching has been done outside.

—Alabama, Eufaula. It was decided at a recent meeting of the directors of the Eufaula Cotton Mills, to increase the capacity of the plant, as reported by us previously. New machinery will be installed in all available space of the present buildings.

—*Alabama, Selma. Work has been started on foundation of addition to be erected to the Estelle Cotton Mills. We gave full report concerning this in a previous edition.

—*Georgia, Columbus. We have been informed by the Eagle & Phenix Mills, that they expect to have their new plant in operation about May. They will install 280 new looms, for manufacturing colored cotton goods. This will give them a total of 48,000 spindles and 1800 looms.

—Georgia, Jackson. An addition of 7500 spindles is to be made to the Pepperton Cotton Mills shortly.

—*Georgia, Monroe. It is expected to have the new additions to the Monroe Cotton Mills completed about the middle of January. We reported in a recent issue that new stock to the value of $50,000 would be raised for this purpose.

—Georgia, Waymanville. It is reported that Causey & Robertson, who purchased the Wayman Cotton Mill, which has an equipment of 3400 spindles and 76 looms, will make enlargements to the plant in the near future.

—*Massachusetts, Fall River. The project of erection of a 100,000 spindle mill here by the American Thread Company has been abandoned for the present. It is said that the labor conditions in this city did not offer satisfactory inducements for building. The outcome of all proceedings, as reported, is that they will enlarge their Willimantic plant with 35,000 spindles.

—*Massachusetts, New Bedford. The Acushnet Mills, which have recently completed erection of new weave shed, are installing 1200 Draper looms in same.

—North Carolina, Greensboro. The Proximity Cotton Mills are to equip their plant with machinery for finishing a portion of the goods manufactured. It is said that this arrangement will not interfere with existing relations with the Southern Finishing and Warehouse Company, which has contracts with all the mills in the plaid combine.

—*North Carolina, Henderson. The Henderson Cotton Mills, which we reported some time ago were to increase their spindles, have installed 5000, giving the plant a total of 15,000.

—*North Carolina, Henrietta. The Henrietta Mills are to install 4320 additional spindles and 125 looms.

—North Carolina, Huntersville. The Anchor Mills have recently completed erection of a new addition, 150 by 75 feet. The machinery will be installed in about 30 days.

—*North Carolina, Reidsville. The Edna Cotton Mills, which have recently been making additions and improvements to the plant, will now add 3000 more spindles.

—*North Carolina, Salisbury. The Kesler Mfg. Co., which has been recently re-organized, is now making plans for doubling the capacity of its plant, which now contains 5000 spindles.

Rhode Island, Providence. The Elmwood Mills are now completing the 2½-story addition, 46 by 103 feet, which has been made to their plant.

—Rhode Island, Rockland. The Ponccansett Mill, which we reported in a previous issue had been purchased by Wm. E. Joslin, for purpose of manufacturing yarn, was bought in the interest of the Joslin Mfg. Co., whose main plant is at So. Scituate.

—*South Carolina, Bennettsville. It is reported that the Bennettsville Cotton Mills, whose plant is now running with a double force of hands, night and day, will add 10,000 additional spindles in the spring.

—*South Carolina, Darlington. The Darlington Mfg. Co. will build an addition to their plant and install 5000 additional spindles. About $75,000 will be expended in improvements.

—South Carolina, Fort Mill. The Fort Mill Mfg. Co. will erect a new building, 112 by 110 feet, 4 stories. 10,000 spindles and 200 looms will be installed.

—South Carolina, Greenville. The Mills Mfg. Co., who were erecting an addition 112 by 105 feet, 4 stories, will install 10,000 additional spindles and 300 looms.

—*South Carolina, Laurens. The Laurens Cotton Mills inform us that their machinery addition will consist of 2810 new spindles and 80 looms, and not 2500 spindles with 30 looms, as previously reported by us.

—South Carolina, Sumter. The directors of the Sumter Cotton Mills, of which A. Moses is secretary, contemplate building a No. 2 mill, which will contain about 5000 spindles. Their present plant is of 4000 spindle capacity.

—*South Carolina, Winnsboro. The new addition which the Fairfield Cotton Mills will erect to their plant will contain from 5000 to 7000 spindles and 400 looms. They make 4-yd. sheetings and yarns.

—Tennessee, Knoxville. It is reported that a large addition will be built to the Brookside Cotton Mills.

—*Pennsylvania, Chester. The Galey & Lord Mfg. Co., which we reported previously were to double size of their plant, have purchased the machinery, etc., of the Mount Vernon Mills, and will remove the same to Chester, where the two plants will be consolidated.

—*Virginia, Danville. The application for an extension to the charter of the Riverside Cotton Mills, in which the capital stock was to be increased from $2,000,000 to $4,000,000, has been withheld, owing to the unfavorable measures which have been introduced into the legislature. This increase was for the purpose of enlarging the plant and making other improvements, which will not be made if the bill prohibiting children under 15 years of age working over 10 hours is passed.

—*Virginia, Lynchburg. The new addition to the plant of the Lynchburg Cotton Mills is 450 by 128 feet, and is to be used as a weave room. 12,000 spindles and 350 looms will be installed, also carding and spinning machinery will be put in Mill No 1.

—Virginia, Petersburg. It is reported that the Pocahontas Mills, which have recently added new machinery to the plant, contemplate making other improvements.

Mills Starting Up.

—*Delaware, New Castle. The Triton Cotton Mills are now being prepared to resume operations in full manufacturing cotton warps. These mills have been idle for five years, and reports have been made frequently without foundation that they were to be started.

—*Massachusetts, Warren. Machinery is now being installed in the No. 4 mill at this place by the Thorndike Co., for manufacturing stockinets. Employment wil be given to about 100 hands.

—*North Carolina, Wilmington. Operations were started this week in the new plant of the Delgado Cotton Mill Company. We have reported data of mill in previous editions.

—*Rhode Island, Warren. The Cutler Mfg. Co. has resumed operations in their plant, which was shut down owing to a strike. It is reported also, that the No. 2 Mill, which has been idle for the last two years, will start operations, giving employment to about 60 additional hands.

Woolen.

New Mills.

—Illinois, Lanark. A weave shed, 18 by 20, is being built here by J. D. Wolfey, who will install in it two carpet looms, which he expects to have in operation by February 1st.

—Ohio, Mount Vernon. Efforts are now being made for the location of a woolen mill at this place. Chas. F. Colville an attorney and John McConnell, who is with a large wool and commission house here, are at the head of the enterprise.

—*Oregon, Portland. We have been informed by Charles Coopey, that it is the intention to form a stock company with capital of $100,000, to build and operate a 3-set woolen mill. As soon as the desired stock is subscribed the company will be organized.

—Pennsylvania Philadelphia. The Saxonia Dress Goods Mills, is the name taken by a new plant located at Howard and Palmer Sts. Thirty broad looms will be installed, giving employment to about 50 hands, which will be increased later.

—Pennsylvania, Philadelphia. A new mill has been started at Coral and Adams Sts., by Aiman & Harper, for manufacturing dress goods.

—Pennsylvania, Philadelphia. The Krook & Bruch Company, Ltd., which has been recently incorporated, has located its plant in the Batty Mills, corner Emerald and Adams Sts., where they will manufacture carpet yarns. William A. Bruch has been appointed chairman and manager of the company.

—*Pennsylvania, Tunkhannock. The new worsted mill, which we reported proposed for this place, has been incorporated by company to be known as the Winola Worsted Yarn Co., with capital of $30,000. D. W. Stark, has been appointed president; C. A. Hungerford, vice-president; B. W. Lewis, secretary; W. C. Kittridge, treasurer and S. Feather, of Shickshinny, general superintendent. About $13,000 will be expended for new worsted spinning machinery.

—*Rhode Island, Mapleville. The Mapleville Woolen Co., which has rebuilt the plant destroyed by fire, will soon start it up on woolen yarns. They have a large contract.

Enlargements and Improvements.

—*Connecticut, Norwalk. The Norwalk and Fairfield Worsted Mills have commenced work upon improvements to accommodate the installation of ten new looms.

—Georgia, Rossville. The Park Woolen Mills have recently purchased $10,000 worth of new machinery, which is now being installed.

—*Maine, Dexter. The Morrison Woolen Company have purchased ten new looms to replace some old ones now in the mill.

—Maine, Houlton. Extensive alterations and additions are to be made to the Houlton Woolen Mill, of which J. W. Maxwell is proprietor.

—Maine, Limerick. A new dye house will be erected in the spring by the company operating the Limerick Mills, which Mr. Garner of Kezar Falls leases, and of which W. M. Chellis is superintendent. This mill is located in plant formerly operated by Holland Bros., and has been in operation since last September.

—Maine, Oldtown. The Oldtown Woolen Mills are to increase the capacity of their plant by installing ten additional looms.

—*Maine, Skowhegan. The Marston Worsted Mill will install 8 new looms and some finishing machinery in the addition being erected to their mill.

—Massachusetts, Plymouth. The Standard Worsted Co. has recently completed the erection of a new weave shed in which new looms are now being installed.

—*Massachusetts, Uxbridge. It is reported that the Norfolk Woolen Co. have made arrangements with Mr. Whitin, who recently purchased the Charles C. Capron Mill, to continue the lease. It is said that changes will be made for the manufacture of woolen yarn instead of woolen goods as made heretofore at this plant.

—*New Jersey, Bloomfield. Thos. Oakes & Co., whom we previously reported were to make an enlargement to their plant, expect to add worsted machinery in the new mill soon.

—New Jersey, Garfield. The Garfield Woolen Co. is installing 3-48 in. sets of shoddy cards in its plant. They are also erecting a one-story brick storehouse, 40 by 100 feet.

—Pennsylvania, Ardmore. Thos. Clegg & Co., who manufacture shoddies and carpet yarns, are to add another set of 60-in. carding machinery to their plant.

—Pennsylvania, Philadelphia. Four new sets 60-inch carding and spinning machinery and other machines have been recntly installed in the plant of Sykes Bros., carpet yarn manufacturers.

—Pennsylvania, Philadelphia. Wm. Davis, who has rented another room in the Missouri Mills, is increasing his output, carpet and rug yarns, by adding another set of machines.

—*Pennsylvania, Philadelphia. John H. Wallace & Bro., Juniper St., above Snyder Ave., with office at 1620 Lombard St., will soon be ready to commence operations in their new plant, having increased their former capacity. They will have 14 sets of 60-inch three-cylinder garnetts on garnetted worsted made from hard ends and broken threads.

—Pennsylvania, West Conshohocken. Machinery for manufacturing fine French spun yarns is being installed in the plant of the Merion Worsted Mills at this place.

—Rhode Island, Peace Dale. The Peace Dale Mfg. Co. are erecting a large four story store house and dye house. They are also installing spinning jack and worsted frames and looms. Their weave room addition is nearly completed.

—Rhode Island, Providence. John Waterhouse, manufacturer of shoddies and wool extracts is now moving into his new plant on Borden St. Four new double cards have been added to equipment, thus doubling his present capacity.

—*Vermont, Ludlow. The Black River Woolen Co., which has leased the Ludlow Woolen Mills, will make extensive alterations and improvements to the plant. A new chain dryer will be installed in the dye house; 3 new fulling mills will replace three old ones, also a winder, in the finishing room, and an additional set of cards will be put in the card room, where 5 sets of cards will be fitted with Apperly feeds.

Mills Starting Up.

—*Massachusetts, Dodge. C. W. Pike's Mill, which has been shut down for sometime, will be put in operation again, making satinets.

—*Massachusetts, Lawrence. Operations have been resumed in Fred Hartley's Wool Scouring Mill, which was recently damaged by fire.

—*Massachusetts, Monson. Work has been started in the dye house department at the branch mill of the Massasoit Woolen Company, of Huntington, Mass. Charles Heritage, of Hyde Park, has been appointed superintendent of the mill, which we reported in a previous issue would begin operations about Jan. 1st.

—Massachusetts, Uxbridge. A recent report states that the five-set Wheelock Mill at this place will be put in operation by Chas. A. Root, manufacturing worsteds.

—*Massachusetts, Webster. The yarn mill of Lemuel Perry, which was recently compelled to shut down, owing to scarcity of water, will be put in operation with a night and day schedule to fill large orders received. Employment will be given to several hundred hands.

—*New York, New York. The Manhattan Worsted Mills, which have been purchased by the Pitkin, Holdsworth Co. have been put in operation, manufacturing worsted yarns.

—Pennsylvania, Philadelphia. It is reported that Lupton & Co. have leased the

Canton Mills, which have been idle for over a year, located at Leverington Ave., High and Baker Sts., and will equip the plant for manufacturing worsteds. The part of the plant burned during occupancy of Thos. Caves & Son will probably be rebuilt, also.

—Rhode Island, Westerly. Plans are now being made by the Westerly Woolen Company for starting up the mill on the Connecticut side of the river, making worsteds.

—Wisconsin, Baraboo. Operations are to be resumed in the Baraboo Woolen Mills, which have been idle for over a year, giving employment to nearly 100 hands.

Mills Shutting Down.

—Iowa, Maquoketa. The Eagle Woolen Mill Company will discontinue the manufacture of woolen goods, and shut down the plant owing to members of the company being engaged in other lines, which does not give them the necessary time to devote to the mill. A committee comprizing Dr. D. N. Loose, D. D. Priaulx, and Fred F. Wray, are in charge of disposal of the plant.

—Ohio, Dresden. The Dresden Woolen Mills have closed down for the winter.

—Pennsylvania, Philadelphia. The Dingley Mfg. Co., 31st and Reed Sts., has been shut down for the winter. The weavers declined to take two looms as in competing mills, and under the one loom scale, the company cannot see their way clear to run the mill and prefer to close it down.

—Utah, Bringham City. The Bringham City Woolen Mills have shut down for the winter.

Knit.

New Mills.

—Georgia, Macon. It is reported that E. L. Martin, with others, contemplates the erection of a knitting mill at this place. Some capital stock has already been subscribed.

—Illinois, Chicago. A new concern has recently been started at 335 Maxwell St., by Herman Newberger, known as the Royal Knitting Mills. 5 knitting machines are operated on a high grade of sweaters, jackets, skirts and bicycle hose.

—Louisiana, Roseland. A knitting mill is being projected for this place. Wm. Palmer, president of the Roseland Improvement Co., who is interested, is now receiving estimates on cost of machinery, etc.

—*New York, Fort Plain. The Fort Plain Hosiery Mills, operated by Dunn, Smith & Co., which have been purchased by the Baileys, will be run under name of The Bailey Knitting Mills Co., Squire Bailey, superintendent. The mill, which is equipped with 1620 spindles and 45 knitting machines, will be put in operation Feb. 15th, making men's and boys' overshirts, and later underwear.

—New York, Utica. The Genesee Knitting Co. is the name of a new concern in which G. W. Rice and John F. Leahy are interested. The plant, which will have a capacity of 150 dozen per day, will be equipped with Fisher knitting machines.

—New York, Utica. The Regal Knitting Co., W. J. Frisbie, president, will start manufacturing fleece-lined goods as soon as possible in the Reynolds Bldg., corner of John and Catherine Sts. The plant will be equipped with 50 new latch needle machines made by the Fisher Knitting Machine Co. Messrs. Byington and Stausfield, of the Kendall Knitting Co. (Utica) are also interested in the company.

—New York, Whitesboro. A new knitting plant, to be known as the Alliance Knitting Mills, Charles A. Powell, proprietor, N. Y. office, 256 Church St., will be put in operation here about February. Ladies' and children's ribbed goods will be manufactured in the mill, which will be equipped with 87 knitting machines, and give employment to about 150 hands. Steam power.

—*New York, Whitesboro. Contract for repairs to the Babbitt Works, purchased by Robt. Ablett, who will manufacture knit goods, has been let to John Haynes, who will soon begin work on same.

—*North Carolina, Salem. The Twin City Knitting Mills have been incorporated with a capital stock of $12,000 for manufacturing hosiery and general line of knit goods. This is the plant in which we previously reported that H. C. Lemly was interested. Associated with him now are: W. A. Lemly, W. B. Pollard and H. P. Brown.

—Pennsylvania, McAlisterville. Lon Spitler is now making arrangements for starting a plant in February manufacturing half and full cotton hose. The plant, which will be equipped with about 16 knitting machines, will give employment to about 25 hands. He is now trying to organize a company for this purpose. None of the machinery has as yet been contracted for.

—Pennsylvania, Honesdale. Kotz Bros. expect to begin operations in their new mill about Jan. 15th. The plant, which will have a capacity of 125 machines, will manufacture ladies' underwear.

—Pennsylvania, Mohrsville. Kring & Steffey have started a hosiery plant here in the manufacture of 80 needle goods. The plant will be known as the Beau Ideal Knitting Mills.

—Pennsylvania, Philadelphia. The Fashioned Hosiery Co. has been incorporated and has established a plant at 2812 North Fourth St. with George B. Pfingst, treasurer, for the manufacture of ladies' full fashioned hosiery.

—*Pennsylvania, Reading. The Reading Glove & Mitten Mfg. Co. has been incorporated with capital of $11,000, with Ferd. Goetz, president, Jno. H. Maltzberger, secretary and treasurer, and E. O. Spindler, superintendent. Machinery is now being purchased abroad by the superintendent and on his return will lease or build a mill for it, probably about Feb. 1.

—*Pennsylvania, Reading. The contract for the erection of the new mill for Nolde & Horst, whose plant was recently destroyed by fire, has been awarded to L. H. Focht. The main building will be 33 by 260 feet, 3 stories, with two wings, each 50 by 67 feet. It is expected to have the mill ready for occupancy about April 1st.

—Pennsylvania, Royer's Ford. A large hosiery mill, which will cost about $100,000 and when completed will give employment to several hundred hands, is to be erected here by E. Emmers & Co. Plans are now being prepared for the building which will be equipped with German machinery for fashioned hosiery.

—*Pennsylvania, Selinsgrove. Work has been started on the new knitting factory to be operated by W. B. Nipple. It is expected that the plant will be put in operation about Feb. 1st, 1900, on hose, with 18 knitting machines, giving employment to about 35 hands.

—*Utah, Logan. The Logan Knitting Factory has commenced operations in the manufacture of woolen hosiery. This company purchased the machinery in plant formerly operated at Ogden City, by Frank E. Willis.

—Virginia, Norfolk. It is rumored that L. B. Moatley, of Portsmouth, is interested in the project of a large hosiery mill at this place.

Enlargements and Improvements.

—Alabama, Anniston. The Anniston Knitting Mills, who at present have a capacity of 125 dozen per day, contemplate increasing the plant.

—*Georgia, Marietta. The Marietta Knitting Company are now installing a new dye plant and 14 new knitters in their mill.

—Louisiana, New Orleans. The Alden Knitting Mills, whom we reported some time ago were to install a spinning plant in their mill, are now adding 2,500 spindles for manufacturing yarn.

—*Massachusetts, Canton. The 3-story brick addition, 50 by 60, which Draper Bros. Co. are erecting, is to be used for manufacturing felts, and not rubber linings, as previously reported.

—Massachusetts, Highlandville. Roper Bros. & Co. have just completed a two-story addition, 65 by 20 feet, to their plant.

—*Michigan, Bay City. In regard to recent report concerning addition to the Bay City Works, we learn that the plant is now known as the Bay City Knitting Company, with capital of $25,000. Henry B. Smith, president; D. L. Galbraith, treasurer, and A. Galbraith, superintendent. Ladies' and men's fine gauge cotton, silkatine and cashmere hosiery is manufactured. The new addition, which will contain 20 new knitting machines, giving plant total of 30, will be put in operation about Feb. 1st.

—*New York, Sauquoit. The Lewis Knitting Company, which has leased the plant formerly occupied by the Sauquoit Silk Mfg. Co., have been making repairs and expect to have the plant soon running in full.

—Pennsylvania, Hummelstown. The Hummelstown Hosiery Company will increase the capacity of their plant by installing twelve new automatic knitting machines.

—Pennsylvania, Reading. George H. Grebe & Co., of Shoemakersville, will remove their plant to this place, having secured a larger building which will allow them to increase their capacity and working force.

—Pennsylvania, Werr'ersville. J. Ulysses Hain, who commenced operating a plant here last June, making half hose, with 5 automatic machines, is to increase that number to ten. He also contemplates adding a dye house to his plant.

—*Virginia, Lynchburg. The Midland Hosiery Co., which has been removed to this place, from Providence, has recently completed the erection of a new dye house. They have also installed new machinery in the plant.

Mills Starting Up.

—*Massachusetts, Lowell. Operations have commenced in the new plant of the Hooper Knitting Company. We gave full report concerning this mill in a previous issue.

—North Carolina, Fayetteville. The Fayetteville Knitting Mills have resumed operations after several months' idleness.

—*Pennsylvania, Bethlehem. The new hosiery mill at this place expects to begin operations about the first part of January, employing forty hands.

—Pennsylvania, Bristol. The hosiery mill, operated by J. R. Pearson, and formerly known as the Providence Mills, has been shut down, owing to Mr. Pearson's ill health and inability to give personal attention to the business. It is thought that the plant will be put in operaion at an early date by outside parties, who will secure it.

—*Pennsylvania, Downington. The new mill of the Downington Knitting Co. started operations Jan. 2nd.

—Pennsylvania, Frankford. The Lanark Knitting Co., 4153 Main St., has been formed with a capital of $7500. William Baird is president and superintendent; Frederick Low, treasurer; W. H. Rowe & Sons, selling agents. They succeed to the business of Baird Bros., who recently assigned. The plant is equipped with 20 machines.

—Pennsylvania, Gettysburg. Operations have commenced in Oscar S. Riley's new knitting factory at this place. Employment will be given to about 65 hands.

—*Pennsylvania, Pottstown. Operations have commenced in the new hosiery mill recently built by Fritz & Krause, giving employment to about 200 hands.

Silk.

New Mills.

—Maryland, Elkton. The Liberty Silk Co., of New York, has made proposition to citizens at this place, that if they will subscribe $50,000 in stock, give land free and exempt from taxation for a period of years, they will subscribe $100,000 and erect a large mill at this place, which will give employment to about 200 hands.

—*Pennsylvania, Forest City. The Alfred Harvey Silk Company, Alfred Harvey and Jos. K. Harvey, Jr., which recently purchased the old car shop at this place and are equipping it for a throwing plant, tram and organzine being their specialty, are to erect an additional two-story building, 50 by 125 feet. When completed the plant will have a total of 10,000 spindles, which it is expected will be in operation about March, 1900.

—*Pennsylvania, Pottsville. L. C. Emmerich has been elected president of the Schuylkill Plush & Silk Co., which is to operate a new plant here; A. T. McAllister, secretary, and H. W. Jacobs, treasurer. The plant, about which we have made previous mention, will be equipped with 26 plush and 6 velvet looms; a 150 h. p. engine and 200 h. p. boiler, and will be valued at about $65,000.

—*Pennsylvania, Renova. The new silk mill, about which we have made previous mention, will be occupied by Walder & Arbenz, proprietors of the Comby Silk Mills, at West Hoboken, N. J., where they now operate 200 looms, making broad silks.

—*Pennsylvania, Scranton. The Klots Throwing Company, of Carbondale, have commenced work on erection of their new mill at this place. The plant will be of brick, 150 by 170, 3 stories, with an annex 26 by 118 feet. New and improved machinery will be installed in mill, which will furnish work for about 300 hands. The company is now operating a small mill here in addition to their Carbondale plant.

—*Pennsylvania, Wilkesbarre. Bamford Bros. have commenced work of removing weaving department of the old mill to the new plant, recently erected, and about which we made reference in previous issues. It is expected to have the plant in operation in about a week or more.

Enlargements and Improvements.

—*Connecticut, Stonington. The capital stock of the American Velvet Co., A. Wimpfheimer, lessee, will be increased from $30,000 to $60,000 for the purpose of enlarging the plant, nearly doubling the present capacity. This was agreeably voted upon by the stockholders of the Stonington Building Association.

—Pennsylvania, Harrisburg. The Harrisburg Silk Mill, which we reported would probably be enlarged, are installing a lot of new machinery, which will require fifty more hands to operate same.

—Pennsylvania, Quakertown. Sixty additional looms will be installed in the Quakertown Silk Mill, giving the plant a total of 100, when completed.

—*Pennsylvania, Williamsport. The Lycoming Silk Mill, which we previously reported was having an addition annexed, has had the capacity increased from 75 to 400 machines.

Mills Starting Up.

—*Pennsylvania, Lansdale. Operations have begun in the new plant of the Lansa Silk Company, whose plant replaces one destroyed by fire some time ago.

Miscellaneous.

New Mills.

—*Massachusetts, Taunton. The National Flax Fibre Company, which was making negotiations for the Eagle Mill plant, through S. L. Gabriel, say they will build an entirely new plant, as no agreement could be made for the Eagle Mill. Work may be started on foundations in the spring.

—Missouri, St. Louis. The St. Louis Cordage Company, a new concern, with which Benj. Crosby is interested, has remodelled and made extensive improvements to the old cotton mill formerly owned by the St. Louis Cotton Mills Co., and which has not been in operation for some time. They expect to begin operations in April or May, with 400 spindles, manufacturing Manila and sisal binding twine and rope. Employment will be given to about 400 operatives.

—New Jersey, Paterson. E. F. Timme & Son, owners of the Victoria Plush Mill, Swarthmore, Pa., are establishing an extensive dyeing and finishing plant in the old Grant Locomotive Works.

—New York, Brooklyn. A new six story brick building, 102x61 and 51x97 feet is being constructed by the Chelsea Jute Mills. This building, which is to replace an old structure, torn down, will cost about $125,000. The addition will be devoted to hemp carpet, napier matting and Smyrna rug business.

—North Carolina, Greensboro. The National Finishing and Warehouse Co. has been incorporated with a capital stock of $120,000 by J. W. London, R. R. King and A. B. Kimball. They contemplate erecting a plant for finishing textile goods, including dyeing, bleaching, printing, etc.

—Pennsylvania, Reading. The Prospect Dye Works, of Philadelphia, have leased a building at 1140 Moss St., and expect to have same in operation in a few days.

Enlargements and Improvements.

—Pennsylvania, Philadelphia. The Angola Dyeing Company, northeast corner Hancock and Huntingdon Sts., will erect an additional story to their plant to be used as a drying room. Contract for the same has been let to Harry Kamp.

—*Pennsylvania, Philadelphia. T. Brophy's Sons, Jasper and Clearfield Sts., have built a new boiler house, in which they have installed new boilers, doubling their boiler capacity. They have also built a new dye house, equipped with the latest fan system of drying, which enables them to handle their work more quickly and fill orders more promptly. They have been crowded with work for some time past.

—Rhode Island, Pontiac. Plans and preparations are now being made for extensive improvements and additions to the Pontiac Bleachery.

Fires.

—Connecticut, Jewett City. A. B. Burleson & Co.'s small thread mill at this place was recently destroyed by fire, and will be rebuilt immediately on a much larger scale. The building was partially insured.

—New Jersey, Paterson. The dye house of Romano & Monze, who recently established a dyeing plant here at 45 River St., has been recently destroyed by fire. The loss will not exceed $5000.

—North Carolina, Long Island. The picker room and contents of the Long Island Cotton Mills was destroyed by fire recently, causing loss of about $7,000

About $3,000 worth of damage was also done to the machinery in the main building. The loss is partially covered by insurance. Work will be started at once making repairs to the plant, and it is expected to have it in running order in about 60 days.

—Oregon, Ashland. The Ashland Woolen Mills, owned and operated by E. K. & G. N. Anderson, were totally destroyed by fire. Loss is $65,000.

—Pennsylvania, Philadelphia. The hosiery mill, operated by Brown & Hunt, at Hazard St., was damaged by fire to the extent of $25,000. A large quantity of stock and some imported machinery are included in loss, which is covered by insurance.

—Pennsylvania, Philadelphia. The Pekin Mills, at Nixon and Umbria Sts., operated by Robert Simister, were badly damaged by fire, caused by an explosion of dust. The loss is estimated at about $2000.

—Pennsylvania, Philadelphia. Joseph Fling's Sons' extensive cotton and merino plant in Germantown was almost completely destroyed by fire. Loss is estimated at about $60,000, covered by insurance.

—Pennsylvania, Philadelphia. O. J. Meinhart's Sons Dye Works, Emerald St., were damaged to the extent of $20,000 by fire.

—Pennsylvania, Philadelphia. Joseph Halford & Sons, who operate a hosiery mill at Germantown, sustained a loss of about $13,000 to their plant, by fire.

—Virginia, Berkley. The Chesapeake Knitting Mills, owned by Foster Black, were damaged by fire to the extent of $5000. The loss is covered by insurance. During repairs the plant will be shut down.

Failures and Suspensions.

—*Massachusetts, Spencer. James E. Fenner, manager of the Warp Knitting Co., upon whose pant an attachment was placed by the New England Cotton Yarn Co., has gone into bankruptcy. Liabilities are placed at about $5,000 with assets at $4,000.

—New Jersey, Avondale. The Castle Silk Company has made an assignment to Edward C. Powles, of East Orange. Liabilities are estimated at about $60,000.-67, with assets to the value of $52,691.33, of which $41,000 is plant and $7,137.70 stock.

—New Jersey, Paterson. Samuel Lederer, of this place, has made an assignment for the benefit of his creditors, to Alfred Shiffer, of the firm of Pelgram & Meyer, for New York, and Wayne Dumont, for Paterson. The liabilities are estimated at about $32,798 and the assets, consisting of plant, silk and silk goods in process of manufacture, at $10,000.

—Ohio, Columbus. The Columbus Woolen Mills Co., which has failed, with liabilities estimated at about $23,000, is now in the hands of Jacob Rapp, who has been appointed receiver.

—Pennsylvania, Philadelphia. Sevill Schofield & Co. have been adjudged voluntary bankrupts. Their liabilities are estimated at about $121,000 in secured claims and $372,000 unsecured, while the assets are placed at $121.

Facts and Gossip.

—Connecticut, Bristol. N. L. Birge Sons' Company has been incorporated with capital of $90,000 divided into shares of $100 each. John Birge, Geo. W. Birge and Ellen S. Wightman are among directors.

—Connecticut Hartford. The Hartford Thread Company has been incorporated at this place with a capital stock of $50.-000, of which 20 per cent. has been paid in cash. I. J. Steane (Hartford), J. C. Perkins, (Meriden) Hiram R. Mills (Bloomfield) and Charles T. Beach (Hartford) are shareholders.

—Georgia, Forsyth. J. H. Huddleston, T. E. Fletcher and Edgar J. Spratling, of Forsyth, contemplate erecting a small shoddy mill here, and are now receiving estimates on machinery, etc., for the same.

—Georgia, Fort Gaines. E. A. Greene is promoting a cotton mill here and is now getting estimates on cost of plant and machinery.

—*Georgia, Macon. A recent report states that the Ocmulgee Mills property, owned by Walter D. Lamar, will be purchased by eastern capitalists, who contemplate using it for a cotton factory.

—Georgia, Newnan. It is reported that E. S. Buchanan, of this place, who is now receiving estimates on knitting machinery, contemplates the erection of a knitting mill.

—*Georgia, Savannah. It has recently been reported that the Southern Bank of Georgia has been unable to find a purchaser for the Savannah Cotton Mills and may put the plant in operation shortly for their own account.

—Germany, Hamburg. Ernst Ad. Wolff, Kl. Backerstrasse 23, Hamburg, asks us to invite builders of hosiery machinery and dealers in supplies to forward to his address any circulars or illustrated catalogues describing their machinery, especially anything that may be new. He is the agent for several South American mills that buy through him.

—Indiana, Indianapolis. A hosiery mill is contemplated for this place, by Greene & Garrard, factory agents, with office in the Stevenson Building.

—*Maine, Fairfield. Lewis Anderson, manager of the Coburn Woolen Mills, Skowhegan, Me., has been appointed manager also of the Kennebec Worsted Mills, of the American Woolen Co., which mill will soon be put in operation.

—Maryland, Hagerstown. The R. E. A. Knitting Mills, formerly operated by J. C. Roulette & Co., will now be controlled by J. C. Roulette alone, the partners having withdrawn from the business.

—*Massachusetts, East Blackstone. The plant of the East Blackstone Spinning & Dyeing Company has been purchased by Alfred H. Lange, who is now sole owner. Jos. Rogister and Max Job

were formerly associated with him in this enterprise. The mill will be put in operation at once.

—Massachusetts, Fall River. It is rumored that plans are now on foot for the consolidation of the Hargraves and Parker Mills at this place and the Peabody and Victoria Mills at Newburyport. Seth Borden is treasurer of each plant.

—*Massachusetts, Holyoke. The Holyoke Plush Co. has been incorpirated in Maine with capital of $50,000; E. M. Goodall, president; Frank Hopewell (Newton, Mass.) treasurer. This is the new company which will operate the Chadwick Mills as previously reported.

—*Massachusetts, Hudson. The Hudson Spinning Co., which we previously reported has been purchased by W. H. Hodisoa, of Sanford, Me., is to be removed to that place.

—Massachusetts, Lancaster. It is reported that Byron Simpson, formerly at the Aldrich Mill, has purchased a small shoddy mill at this place, which he contemplates enlarging.

—Massachusetts, Lowell. The American Woolen Company's Faulkner Mills at this place are now known as the Bay State Mills.

—Massachusetts, Malden. The Adams Print Works has been incorporated here with capital of $10,000; J. A. Lind, president and H. B. Adams, treasurer. Mr. Lind has been interested in the Mansfield Print Works.

—*Massachusetts, Pittsfield. It is probable that the Taconic Mill will be running in full by March 1st, as the preparatory work for starting is progressing rapidly. Wilson & Horton have dissolved. Mr. Wilson takes the Taconic Mill and Mr. Horton is reported as looking for another suitable plant.

—New Jersey, Athenia. Stubbs & Miller's plush mill, which gives employment to about 100 hands, has been shut down, and plant is being removed to Pottsville, Pa.

—New Jersey, Deckertown. The plant of the Meller Mfg. Co., which we reported had gone into bankruptcy, was sold at public auction to Theo. F. Margarum, who purchased for the Farmers National Bank.

—New Jersey, Jersey City. C. N. King, W. J. Lamb and L. Bouker have incorporated the Corticelli Silk Co., with a capital stock of $30,000, for manufacturing silk.

—New Jersey, Newark. The Agawam Finishing Company has been incorporated at this place with a capital stock of $500,000, by H. M. Barrett, F. R. Lehlbach, and F. A. Lehlbach, for finishing cotton goods, etc.

—New Jersey, Paterson. It is reported that James Elliott Co., who have been operating a small plant in the manufacture of linens and towelings in the Granite Mill on Grand St., will remove the plant to another city. It was at first thought that the building here would be enlarged.

—New Jersey, Paterson. The plant at 93 River St., formerly operated by James Young, has been leased by Thomas Goldie, for manufacturing broad silks sold through Spellman & Co., New York. The mill is equipped with 30 broad looms.

—New Jersey, Trenton. The National Ramie Co. has been incorporated with authorized capital of $500,000, by F. W. Garvin, Angus Wright and E. B. Hawkins.

—New York, Elmira. The finishing department of the John N. Stearns & Co.'s plant at New York City is being removed to this plant, where all finishing will be done hereafter.

—*New York, Herkimer. Hon. Warner Miller, and two sons, Guy H. and Max, have purchased H. G. Munger and C. R. Snell's interest in the plant of the Gem Knitting Co. at this place. Guy H. Miller will retain his office as treasurer.

—New York, Rochester. The Seamless Hosiery Co. has removed branch mill at this place to Elmira, where plant is operated under name of Superior Knitting Mills Co., about which we made mention in a previous issue.

—New York, Sidney. Proceedings for the voluntary dissolution of the Clark Fabric Company have been filed in the county clerk's office at Fonda, N. Y. Joseph H. Clark, who has been appointed temporary receiver, will conduct the business without interruption. This action has been taken in consequence of the death of A. G. Richmond, who held position of treasurer.

—New York, Utica. It is reported that negotiations are now under way for the consolidation of the Utica Steam Cotton Mill and the Mohawk Valley Cotton Mills. They are closely allied. Some of the directors in one concern are also interested in the other.

—New York, West Park. The mill formerly operated at this place by Sutcliffe Bros. is now running under charge of Henry Sheffer, agent, manufacturing wool, merino and cotton shoddy and cotton bats. The plant is equipped with 2 rag pickers, 1 duster and 2 cotton cards.

—North Carolina, Chapel Hill. A rumor states that W. E. Lindsay of this place is now receiving estimates on knitting machinery, with a view to building a mill.

—North Carolina, Charlotte. D. A. Tompkins has sold his interest, which he purchased a short time ago, in the Alpha Cotton Mills. The company has been reorganized with W. D. Wheat, president and treasurer; J. T. Anthony, vice-president, and J. G. Wardlaw, secretary. The plant will continue manufacturing the same class of goods as previously.

—North Carolina, Durham. The Commonwealth Cotton Mfg. Co. has discontinued the manufacture of hosiery and sold all the machinery used for that product.

—North Carolina, Lumberton. Efforts are being made by the citizens of this place to erect a cotton mill. Although no definite steps have yet been taken, it is thought that the project will materialize.

—*North Carolina, Fayetteville. The Lafayette Knitting Mill Company has been incorporated with a capital of $10,000, by H. M. Pemberton, W. S. Cook, J. P. and A. J. Cook. This is a reorganization of the Fayetteville Hosiery Mills, of which H. M. Pemberton is proprietor.

—North Carolina, Greenville. It is reported that A. A. Andrews has secured subscriptions amounting to about $20,000 toward the project of a new cotton factory here.

—North Carolina, New Bern. We have learned that there is no foundation to the rumor concerning the erection of a large cotton duck mill at this place, but that P. H. Pelletier is interested in project of a spinning mill.

—North Carolina, Worthville. The Worth Manufacturing Company, which is installing new machinery in the mills, expects to begin night work shortly.

—*North Dakota, Bismark. The Kansas State Penitentiary expects to begin operations about Feb. 1st, manufacturing binder twine, machinery for which has all been installed.

—*Oregon, Union. The Union Woolen Mill, which has been recently shut down, has been sold to A. E. Eaton, who was interested in the project when plant was first built.

—*Pennsylvania, Annville. The firm of Andrew Krider & Sons has been changed to A. R. Krider & Bro. We recently reported that they were making additions to plant. They now operate 18 knitters, 3 loopers and 4 ribbers, in the manufacture of fine seamless half hose, selling produce direct.

—Pennsylvania, Philadelphia. Binder, Ellis & Brown, who have completed a new mill at Allegheny Ave. & C. St., are now removing their plant there from 19th and Hamilton Sts. This is one of the mills affected by the upholsterers' strike.

—Pennsylvania, Philadelphia. Thomas Henry & Sons, Trenton Ave. and Tioga Sts., have purchased the plant formerly operated by Thomas Dolan & Co., at Second and Oxford Sts.

Pennsylvania, Philadelphia. Walter & Wright, operating the shoddy and waste plant at Nicetown, have dissolved partnership by mutual consent. The business will be carried on by F. W. Walter under the name of F. W. Walter & Co.

—Pennsylvania, Reading. The Keystone Knitting Mills, Limited, have been incorporated by Levi B. Paxon, Jr., Frank W. Robinson and Annie K. Paxon.

—*Pennsylvania, Shickshinny. The plant of S. Feather & Co. will be carried on by Mr. Feather's sons, Samuel and William. Mr. Feather is now interested in the Winola Worsted Yarn Company at Tunkhannock.

—Rhode Island, Providence. The machinery in the plant of the Glen Hosiery Co. has all been sold. This company had never commenced manufacturing goods.

—*Rhode Island, Woonsocket. The Hamlet Mills property, which was sold at mortgagee's sale, Jan. 9th, was purchased by Charles E. Thomas, agent and treasurer of the company, acting as agent for Frank C. Sayles, the mortgagee, for $75,000, while the mill supplies, etc., were also purchased by him for $10,000. The mill will continue running as usual. The concern is being reorganized and the sale was part of the plan and does not involve any change in management.

—Rhode Island, Woonsocket. Sayles & Gilleran, who are operating their plant in the American Worsted Co.'s Mill, contemplate purchasing the plant from the receiver of the company and will install additional machinery, doubling the capacity of the plant. This will give employment to about 200 people.

—Rhode Island, Wyoming. The Hope Valley Silk Co. has been reorganized as the Monopole Weaving Co., with capital stock of $6000. Max. Bayerle, president and treasurer; F. Phafter, secretary; Wm. H. Wylie, manager. The plant, which is equipped with 50 broad looms, manufactures broad silks and linings, giving employment to about 75 hands.

—South Carolina, Abbeville. It is rumored that Judge Klugh and Messrs. Smith and McKay are interested in a project to build a new cotton mill here, of which Mr. McKay has been selected for president. The aforesaid men have already subscribed $35,000 toward the enterprise, and it is probable that plan will be carried through.

—South Carolina, Indian Hook. The Catawba River Power Company has been incorporated at this place with capital stock of $100,000 to develop water power, manufacture cotton goods, etc. W. C. and F. C. Whitner (Anderson), and W. G. and R. H. Wylie (New York) are the incorporators.

—South Carolina, Spartanburg. The Beaumont Mills have increased their capital stock to $125,000.

—Texas, Denton. At a meeting held recently in regard to securing capital stock for purpose of organizing a company and erect a cotton mill, a committee, comprising John A. Hann, A. E. Graham and R. J. Wilson, was appointed to solicit subscriptions. It is proposed to organize with a capital stock of about $75,000, of which $30,000 has been spoken for by parties interested in the project.

—*Texas, Taylor. It is reported by W. S. Wade, who is chairman of the committee appointed to make arrangements for locating a cotton mill here, that two concerns in the east have made offers to remove their plants here for a consideration. One of the mills, wishes a guarantee of subscribed stock to the amount of $25,000, in consideration of removal. It is preferred to have the factory owned by home capital, but if the required stock cannot be secured, they will probably consider the outside offer.

—Virginia, Bartonsville. The Crawford Woolen Company, of Martinsburg, has purchased the small woolen mill at this place and will operate it in connection with their other establishments. The company will remove its New York office to Martinsburg during the month.

PERSONAL RECORD.

Cotton.

—W. E. Bacon, overseer of carding at the Lynchburg Cotton Mill, Lynchburg, Va., has retired owing to ill health.

—W. I. Busbee, formerly assistant overseer of weaving at the Whitney, S. C., mills, has secured the position of overseer of weaving at the Crescent Cotton Mill, Rock Hill, S. C.

—J. B. Biggs, formerly loom fixer in mill No. 1 of the Hope Mills Co., Hope Mills, N. C., has been promoted to overseer of weaving at mill No. 3 of the Hope Mills.

—Charles Collins has been promoted from head bookkeeper for the Berkeley Co., Berkeley, R. I., to superintendent, succeeding W. H. Magee.

—P. B. Cullum has resigned his position with the Lane Mills, New Orleans, La., to accept the position of overseer of spinning at the Galveston Cotton Mills, Galveston, Tex.

—W. P. Campbell, of Columbia, S. C., has succeeded E. Farrell as superintendent of the Efird Mill at Albemarle, N. C.

—F. H. Cotton has succeeded J. S. Davis as superintendent of the Hope Mills Mfg. Co., Hope Mills, N. C. Mr. Cotton is the son of S. H. Cotton, who was superintendent of the mill for some time before Mr. Davis took charge.

—Henry C. Dexter, for several years head bookkeeper for the Greene & Daniels Mfg. Co., Pawtucket, R. I., has been appointed agent of the company to succeed Benjamin F. G. Linnell, resigned.

—Thos. F. Daley has been appointed foreman of the Fall River Machine Co.'s machine shop, Fall River, Mass., succeeding Mr. Burnett.

—O. D. Drew, superintendent of the Danielsonville Cotton Co., Danielson, Conn., has resigned and is now with the Clinton Mill, Woonsocket, R. I. J. N. Ball is his successor.

—J. Edwards is now overseer of carding at the Tecumseh Mills, Fall River, Mass.

—F. E. Foster, who has been employed at the Acushnet Mill, New Bedford, Mass., for some time, has resigned to accept the position of superintendent of the Manchester Mfg. Co., Macon, Ga.

—J. F. Gainer, formerly of Nashville, Tenn., has accepted the position of weaving with the new Aragon Mills, Aragon, Ga. Good weavers and loom fixers wanting work in that section should correspond with Mr. Gainer.

—J. W. Hawks has succeeded John Riley as overseer of spinning at the Edna Mills, Reidsville, N. C.

—D. R. Harriman, superintendent of the Poe Mill, Greenville, S. C., has severed his connection with that concern to assume charge of the Newberry Cotton Mill, Newberry, S. C.

—John A. Hopkinson of Waco, Texas, has been engaged as superintendent of the new mill at Laurel, Miss.

—J. H. Hines, formerly with the Fulton Bag & Cotton Mills, Atlantic, Ga., is now general manager of the Cedartown Cotton Co., Cedartown, Ga.

—Frank A. Hawkins of Lawrence, Mass., is now overseer of No. 3 ring spinning room at the Amoskeag Mfg. Co., Manchester, N. H.

—Arthur N. Hersom, late overseer of weaving at the Fisher Mfg. Co., Fisherville, Mass., has been engaged as overseer of weaving and designer at the No. 2 mill of the Berkshire Co., Adams, Mass.

—Wm. S. Harbin, recently night superintendent of the Hartwell, Ga., mills, has accepted the superintendency of the Palmetto Cotton Mills, Palmetto, Ga. Mr. C. H. Robinson, formerly superintendent, will go to Weymanville, Ga.

—James Isherwood, for a number of years overseer in the weave room of B. B. & R. Knight's cotton mill, Hyde Park, Mass., has resigned to accept a position in a mill at Lowell.

—R. B. Lane has been appointed overseer in place of Hartley S. Chapman, formerly overseer of No. 1 spinning room of the Great Falls Mfg. Co., Somersworth, N. H.

—Robert L. Lucas, formerly overseer of carding at the Maginnis Cotton Mills, New Orleans, La., has been appointed superintendent of the Sycamore (Ala.) Mills.

—James Marshall, secondhand in the Whitman Mills, New Bedford, Mass., has resigned.

—George Maddocks, for the past year in charge of weaving at the Meridian, Miss., mill, has returned to his old position as overseer of weaving at the Swift Mill, Columbus, Ga.

—James R. Pearce has resigned as superintendent of the Warren Mfg. Co., Warrenville, S. C., to accept the superintendency of the Fulton Bag & Cotton Mills, Atlanta, Ga., a position which he held formerly and resigned some years ago.

—Edward A. Mongeon, for ten years superintendent of the Blackstone, Mass., Cotton Co.'s mills, has accepted the position of superintendent of the Lonsdale Company's mills at Lonsdale and Ashton, R. I., succeeding Superintendent C. W. Pratt, who some time ago resigned.

—George W. Murphy, who recently resigned as superintendent of the La Grange Mills, La Grange, Ga., has received a similar appointment by the Hogansville Mfg. Co., Hogansville, Ga. G. W. Carpenter is the new superintendent at La Grange.

—A. S. Matheson has retired from the superintendency of the Eagle & Phoenix Mills, Columbus, Ga.

—F. S. Mosher has been elected managing superintendent of the new Barker Cotton Mill Co., Mobile, Ala.

—Samuel Moreland, who is brother of the present superintendent, J. T. Moreland, has been appointed overseer of spinning of the No. 1 mill of the Henrietta Cotton Mfg. Co., Caroleen, N. C.

—Edward P. Nichols, at a meeting of the directors of the Great Falls Mfg. Co., Somersworth, N. H., held in Boston recently, was elected treasurer, in place of his brother J. Howard Nichols. Mr. Edward P. Nichols has been assistant treas-

urer of the company for many years and has a thorough knowledge of the duties of the position.

—J. R. Posey, formerly assistant overseer of weaving in the Indian Head Mills, at Cordova, Ala., has been appointed overseer of weaving at the Millfort Mill, Fort Mill, S. C., to succeed C. H. Gray.

—Albert E. Pingree, overseer at the Globe Mill, Woonsocket, R. I., has resigned to accept the position of overseer in the mill of the Ponemah Co., Taftville, Conn.

—F. L. Robbins will be superintendent and manager of the reorganized Kesler Mill at Salisbury, N. C., this year.

—D. Ricker has accepted the position of secondhand of carding at the Lane Mills, New Orleans, La.

—John Riley, formerly overseer of spinning at the Edna Cotton Mills, Reidsville, N. C., is now in a similar capacity in the Huntsville Cotton Mills, Huntsville, Ala.

—T. B. Stevenson, for the past five years overseer in the carding room of the Merrimack Mfg. Co., Lowell, Mass., has accepted the position of superintendent of B. B. & R. Knight's mill at Hyde Park, Mass.

—John W. Sinister, for many years connected with the Warren Mfg. Co., Warren, R. I., has accepted the position of overseer of weaving at the new Parker Mill, Warren.

—Henry Smith, formerly of Sycamore, Ala., has been appointed superintendent of the new spinning mill at Sylacauga, Ala., called the McDonald Cotton Mill.

—J. Herbert Sawyer, for 17 years connected with the Newmarket Mfg. Co., Newmarket, N. H., as treasurer, has resigned, and is succeeded by Linzee Prescott, treasurer of the Atlantic Cotton Mills, Lawrence, Mass.

—Frederick Stoddard has accepted a position in the beaming department of the Monument Mills, Housatonic, Mass.

—Columbus Stewart is now filling the position of overseer of weaving in the No. 1 mill of the Exposition Cotton Mills Co., Atlanta, Ga.

—R. L. Stephens, formerly with the Water Valley, Miss., mills, is now overseer of carding in the Lanett Mills, West Point, Ga.

—John H. Stephens, formerly of Montgomery, Ala., is now overseer of spinning of mill No. 2 of the Phoenix Cotton Mills Co., Nashville, Tenn.

—Thomas Smith, secondhand in the weave room of mill No. 1 of the Pelzer Mfg. Co., Pelzer, S. C., has been made overseer of weaving for all three mills of that company at Pelzer.

—James J. Ward has been promoted from overseer of weaving at the Warren Mfg. Co., Warrensville, S. C., to superintendent, succeeding James R. Pearce.

—A. S. Winslow, who for the past seven months has been overseer of carding and spinning at the Erwin Cotton Mills, Durham, N. C., has been appointed general superintendent of the plant.

—J. N. Trainer, formerly a member of the firm of D. Trainer Sons Mfg. Co., Chester, Pa., is now superintendent of the Richmond Spinning Mills, Chattanooga, Tenn.

—E. R. Williams is now superintendent at the Galveston, Texas, Mill, having held the same position several years ago, and has returned in the same capacity.

—W. H. Tobey has been appointed head paymaster by the Lonsdale Co., Lonsdale, R. I.

Woolen.

—George W. Burr, formerly with the Middlesex Co., Lowell, Mass., is now with the American Woolen Co. at Dover, Me., as overseer of finishing.

—E. A. Bailey, of Jacksonville, Ill., is now boss finisher for the Bonaparte Woolen Mills, Bonaparte, Iowa.

—Theodore, G. Beckert, textile and jacquard designer and instructor of the textile evening school at Pittsfield, Me., has severed his connection with the Waverly Woolen Mills, and has accepted a position with the Georges River Mills at Warren, Me.

—Herbert S. Cook, paymaster for several years at the Globe Mill, Woonsocket, R. I., is now bookkeeper for the Dunn Worsted Co., succeeding James W. Greene.

—Eugene Dorr, designer at the New England Mill, Rockville, Conn., has resigned to accept a similar position in Plymouth, Mass. Clarence Cady, who has been assistant designer, has succeeded Eugene Dorr, and now has Hugh Ballentyne as assistant.

—George W. Dixon, who has been overseer of carding and spinning at the Thomas Kent Mfg. Co., Clifton Heights, Pa., has resigned the position to accept the superintendency of the carding and spinning department at the mill of Wm. Wood & Co., Philadelphia.

—John Dunn, for the past year superintendent of the mill of the Crosby Mfg. Co., East Glastonbury, Conn., has resigned.

—D. A. Davenport, formerly of Pittsfield, is now with B. Wink & Co., Philadelphia, as assistant designer.

—J. H. Evans, formerly overseer of carding and spinning at the mill of the Conshohocken (Pa.) Woolen Co., has gone to Grand Forks, N. D., to the Grand Forks Woolen Mills.

—Arthur Fieldhouse's services have been secured as superintendent by the New Albany Woolen & Cooton Fibre Co., New Albany, Ind. Mr. Fieldhouse has had charge of the Old Kentucky Woolen Mill and Eclipse Woolen Mill, both of Louisville, and will take the place of W. E. Thompson, who so mysteriously disappeared a short time ago.

—John R. Greenwood has succeeded Daniel MacLachlin as head overseer of dyeing in the Nos. 1 and 2 woolen mills operated by the John Williams Mfg. Co. of Philadelphia and Trenton, N. J. Mr. Greenwood was previously connected with the Chester (Pa.) Dyeing Co. in a similar capacity.

—W. S. Hodgson has succeeded J. R. Milson as superintendent at the Cranston Mill, Bristol, R. I.

—John Lockwood, Trenton, N. J., has succeeded John F. Scott as instructor of wool carding and spinning at the Philadelphia Textile School.

—A. A. Langwald, superintendent of the Sayles and Jenks Woolen Mill, Warren, Mass., resigned recently. He has been in ill health for some little time and will go South for the winter. E. G. Field, of Fall River, Mass., has become superintendent of the mill. Mr. Langwald had been in the employ of Sayles & Jenks for a number of years, and his resignation was much regretted. The employes presented him with a valuable watch and gold chain, and Mr. Jenks gave him a ring.

—George R. McDougall, formerly of Medford, has accepted the superintendency of the Stoughton Woolen Co.'s shoddy mill at West Stoughton, Mass. Mr. McDougall is the son of Charles R. McDougall, who is making such a success of the newly organized Charles River Woolen Mills at North Bellingham.

—Ira D. Martin of Leominster, Mass., has secured the position of boss weaver for A. Roberts & Co., Haverhill, Mass.

—Edwin May has resigned as boss carpenter at the Putnam Woolen Co., Putnam, Conn., to accept a position at the Knowles Loom Works, Worcester, Mass.

—Edwin Milner has retired from the position of agent of the Milner Co., Moosup, Conn., in the employ of the American Woolen Co. Charles Bragg, superintendent of the mill, has taken Mr. Milner's place.

—James Ogden, Manayunk, Pa., is night overseer of spinning for the Bridgeton (N. J.) Woolen Co.

—Fred Pfeiffer has accepted a position as weaving instructor with the Philadelphia Textile School, Philadelphia.

—James Pew, an overseer in the Ipswich Mills, Ipswich, Mass., has resigned, to accept a position as boss carder in Dayville, Conn.

—James Quinn, of Pascoag, R. I., has accepted the position of boss finisher in the Harrisville Mills, Harrisville, R. I. John Lenahan, who was formerly employed as boss finisher at the mills, is in the textile school at Philadelphia.

—Turner Rollinson has accepted the position of dyer with the Ashaway Woolen Co., Ashaway, R. I.

—David B. Smith, for several years superintendent of the worsted yarn department of the Globe Woolen Co., Utica, N. Y., has accepted the superintendency of the new mill of the Phoenix Mills Co., Manayunk, Philadelphia.

—D. J. Sheehan, Cohoes, N. Y., is now employed by W. E. Tillotson, Pittsfield, Mass., as overseer of carding, having succeeded P. H. Curley, who returned to his old position at the Taconic Mill.

—Walter Taylor, formerly superintendent of the Pondicherry Co., Bridgton, Me., has succeeded George G. Crane as superintendent of the Mt. Battie Mill, Camden, Me.

—J. B. Twaddle, for a number of years foreman in J. O. Ballard & Co.'s pant factory, Malone, N. Y., has accepted the superintendency of the Warrensburgh Woolen Co., Warrensburgh, N. Y. D. J. Watkins is now filling the position formerly held by Mr. Twaddle with J. O. Ballard & Co.

Knit.

—William A. Canfield, recently of North Coaticook, Que., has recently accepted the superintendency of the knitting mill of the Canadian Woolen Mills Co., St. Hyacinthe, P. Q.

—John H. Akin, formerly at the Commercial Knitting Mills, Troy, N. Y., has succeeded D. J. Sheehan as overseer of carding at the Hope Knitting Co., Cohoes. Mr. Sheehan has accepted a similar position at Pittsfield, Mass.

—W. E. Cahill, who for some time has most acceptably filled the position of superintendent at the Walontha Knitting Mill, Richfield Springs, N. Y., has accepted a similar position at the Gem Knitting Co., Herkimer, N. Y. J. V. Crawford of Amsterdam will fill the position left vacant by Mr. Cahill at Richfield Springs.

—Charles H. Gorton has resigned as general manager of the Glenark Knitting Co., Woonsocket, R. I., to become superintendent of the Columbus Mfg. Co., Columbus, Ga.

—James Heslin has succeeded John Lockwood as overseer of carding for the Waterford (N. Y.) Knitting Co.

—W. J. Harrison, for the past three years manager, as well as share holder of the Danville Knitting Mills Co., Danville, Pa., recently disposed of his share in the mills and resigned as manager.

—Thomas Scannell, for the past ten years overseer of the packing room in Robert MacKinnon's Knitting Mills, Little Falls, N. Y., has resigned. Rollo F. Pratt has succeeded him.

—William H. Stewart, superintendent of the Commercial Knitting Co.'s mill in Cohoes, N. Y., has accepted a position in the office of the company at Troy. John Scott has succeeded him as superintendent.

—John E. Booth, boss carder at the Franklin (Mass.) Knitting Co., died in that city recently, aged 55 years.

Deaths.

—Joseph H. Parsons, president of the Parsons Mfg. Co., Cohoes, N. Y., died of paralysis at the residence of his son, Samuel H. Parsons, at Waterford, N. Y., January 10th. Mr. Parsons was a highly respected citizen and successful manufacturer. At the time of his death he was a director in the Cohoes National Bank.

—I. W. Springfield died Jan. 7 at his residence in Wolfboro, N. H. He gained a complete knowledge of the manufacture of woolen fabrics while in the employ of the Mechanics Mfg. Co., now known as the Norway Plains Co., at Rochester, where he was for 10 years, starting in when a boy of 14. In 1858 he began the manufacture of blankets at South Wolfboro, where he since increased the business, continually improving the quality of the product, until the mills have now the reputation of turning out among the best blanket of any concern in the country. A large number of hands are given employment, and through his liberality and the long periods of regular and steady employment, there was but

one labor difficulty at the mill, which was speedily adjusted. Aside from his manufacturing, Mr. Springfield also engaged in lumbering and large farming enterprises, and was also president of the Rochester Agricultural & Mechanical Association until last year, and during his term of office the wonderful growth of the fair took place.

—Daniel A. Taylor died at his home, 5 Grove Ave., Potter Hill, R. I., last month. He was for many years in the employ of J. P. Campbell & Co., starting in in the lowest capacity in the mill and gradually working his way up until he was superintendent, which position he occupied at the time of his death. About a year ago he went to Dayville, Conn., to take charge of the mills there, but did not remain many months, and there was great rejoicing at Potter Hill on his return.

—Joseph Crowson died recently at his home in Germantown, Pa., aged 84 years. Mr. Crowson came from England to Germantown and carried on the manufacture of stockings on Church St. Subsequently he engaged in farming in Montgomery County, and later returned to Germantown, associating himself with his nephew, John B. Crowson, in the real estate business, retiring about two years ago.

—Marcena Hitchcock, president of the Hitchcock & Curtiss Knitting Co., manufacturers of woolen and stockinet goods at Hartford, Conn., died at his home 1183 Broad St., recently, aged 68 years. Mr. Hitchcock retired from active business about two years ago on account of ill health, but still retained the presidency of the company.

—Alexander D. Easton, of the firm of A. D. Easton & Co., cotton brokers of Fall River, Mass., died at his home in that city recently, in his 63rd year. He was born in Brooklyn, N. Y., but was a resident of Fall River all his life, except for a short time when he returned to Brooklyn to accept a position as clerk in a grocery store. He was also clerk in the office of the American Print Works and Fall River Iron Works for several years. He went into business as a cotton broker, but retired to become associated locally in private banking, but not meeting with success he went back into cotton brokerage, and during the past 10 years had been engaged in that business either singly or with his nephew, James Buffington. Mr. Easton was an expert judge of cotton, and had met with much success.

—Walter Folger Baxter, a wellknown dyestuff broker, whose office was at 76½ Pine St., New York, died at his home recently of pneumonia, aged 36 years.

—Charles Abram Vickery died recently at his home in Rochester, N. Y., aged 60 years. He was born in Braintree, Mass., May 5, 1839. In 1863 he went to Rochester and soon after entered the employ of Garner & Co., in whose cotton mill his father was manager, and on the death of the latter, Mr. Vickery was appointed superintendent and continued in that position successfully for several years.

—Henry T. Jenkins, one of the oldest New York dry goods commission merchants, died in his 84th year, last month.

—Arthur Stewart, a retired carpet manufacturer, died January 21 at his home on Sumac St., Wissahickon, Pa. Mr. Stewart was born in Scotland, December 6, 1841. He entered the carpet mills of his father, William Stewart, at Wissahickon, and subsequently, with his brother, was taken into the business. Upon the death of the elder Stewart, the business was reorganized and continued until about twenty years ago, when the firm was dissolved, and Arthur Stewart continued the manufacturing of carpets until 1890, when he retired. He had been an invalid for three or four years as the result of a paralytic stroke.

—Samuel Greenwood, senior member of the firm of Samuel Greenwood & Son, died at Coatesville, Pa., January 13th, aged 76 years. Up to within a week of his death, which was caused by heart disease, Mr. Greenwood was found at his desk at the National Bank, of which he was president. For many years he conducted a woolen mill at Rock Run, and made shawls, mostly for the government.

—Edward Plummer, of Lisbon Falls, Me., died last month, aged 70 years. He was interested in the Worumbo Mills, and was a promoter of the Rumford Falls and Rangeley Lakes Railroad.

—Gideon B. Mowry, a prominent citizen of Chicago, Ill., died at his home, 7208 Union Ave., January 7. For many years he was proprietor of a mill in West Eaton, N. Y. For over fifty years, Mr. Mowry lived in East Greenwich, R. I., early in the 70's removing to Chicago, where he continued in the woolen manufacturing business, retiring but a few years ago.

—Robert Caswell, for years an employe of the Lippit Mill and of the Clyde Print Works, died at his home in Lippitt, R. I., January 10th, aged 73 years.

—Louis R. Gascou, seventy-six years old, a manufacturer of a fine silk cloth used in flour mills, died at the New York Hospital, recently. He made a misstep going upstairs and fell backwards into the basement and fractured his skull. He died soon after reaching the hospital.

—Morris P. Anderson died at his home in Statesville, N. C., recently. Up to within a few months of his death, he discharged his duties faithfully as secretary and treasurer of the Ada Cotton Mill, Charlotte, N. C., when he was compelled to resign owing to ill health. For many years he was a resident of Charlotte, and was held in high regard in that vicinity and everywhere where he was known.

—Francis McCoy, an overseer in Stevens' Linen Mill, Dudley, Mass., died last months after a few days' illness of pneumonia.

—Austin C. Graves, identified for many years with the rag and shoddy trade, died at his home in Albany, N. Y., December 23d.

TEXTILE BOOKS.

The following are recent publications, which we will furnish upon receipt of their price.

Plain Series of Cotton Spinning Calculations, by William H. Cook, 91 pages.

This book gives original calculations relating to cotton spinning, giving the position of the different pulleys and wheels, which are taken into consideration when making calculations; and also points where the necessary changes are made when altering from one count to another. Price $1.

Sizing Ingredients, Size Mixing and Sizing. By Hugh Monie, Jr., 65 pages, Illustrated.

This book is intended to be a complete practical work dealing with everything relating to the modern processes of sizing, and takes up such subjects as sizing ingredients (flours, softeners, deliquescent substances); Size preparations (Chloride of Zinc, Whitening material, Percentage of size, etc.); Fermentation; Mixing; Construction of Sizing Machine; Working of the Machine; Definition of Technical Terms; Calculation, etc. Price $1.00.

Practical Mechanics for Textile Workers. By George R. Smith, 235 pages.

This is a valuable work on mechanics, pertaining to textile factories. It is written by the assistant lecturer and demonstrator in carding and spinning, Yorkshire College, Leeds. The book deals with measurements, which all mill men should be able to take accurately; with the units and apparatus employed in estimating heat, work and power; the disturbing influences in a machine which go towards making a machine what it is; cams, levers, pulleys; gears, shafting, belts; transmission of power; hydraulics; boilers, fuel, motive power, etc. Price $2.50.

Cotton Spinning. By W. S. Taggart Three volumes. Price $7.50.

This work treats of the subject in an exhaustive way, from the first operations in the picking, to the last in the spinning department. The various parts of the subject have been treated in such a manner that the young student may greatly benefit himself and use it as a text-book, while the older readers will find in them much of interest, in satisfying a desire for a fuller knowledge and a more perfect grasp of the principles underlying many of the processes in much of the mechanism of cotton spinning machinery. A spinner can make no mistake in procuring this work.

The Student's Cotton Spinning, by Joseph Nasmith.

This is a standard book on spinning. It treats of mixing, opening, scutching, carding, card clothing, combing, roving, spinning, reeling, waste spinning, etc. 393 pages. Price $3.00.

Cotton Weaving and Designing, by John R. Taylor, 288 pages, fully illustrated.

This work is by a well known writer and lecturer on this subject, and treats of such topics as: Hand and Power Looms; Drop and Circular Box Looms; Dobbies; Jacquard and Leno Weaving; Terry Looms; Principles of Designing, Plain and Figured; and Textile Calculations. This work is of much value. Price $2.50.

Woolen Spinning, by Charles Vickerman.

This is a most excellent work for students in textile schools, and for skillful, practical men in woolen mills. It takes up the principles that underlie the various processes and operations of the earlier parts of manufacture. It has chapters devoted to Wool; Wool Sorting; Scouring; Bleaching; Mixing, etc., Carding and Spinning. 352 pages. Price $1.75.

Jacquard Weaving and Designing, by T. F. Bell. 300 pages. Fully illustrated.

The contents of this work have been derived from a long course of art and technical training, together with a lengthy practical experience in textile manufacturing and designing, by the author. The descriptions are as concise as is compatible with fairly clear explanation. Price $4.00.

The Mechanism of Weaving, by T. W Fox.

A treatise of 464 pages, presenting exact and practical information upon the principles of weaving. Takes up such topics as Harnesses; Shedding; Dobbies; Jacquards; Card Cutting; Picking; Pickers; Swivel Weaving; Beating Up; The Reed; Taking-up Motion; Temples; Trimming and Fixing of Parts. 256 illustrations. Price $2.50.

Manual of Dyeing, by Knecht, Rawson and Loewenthal. In three volumes.

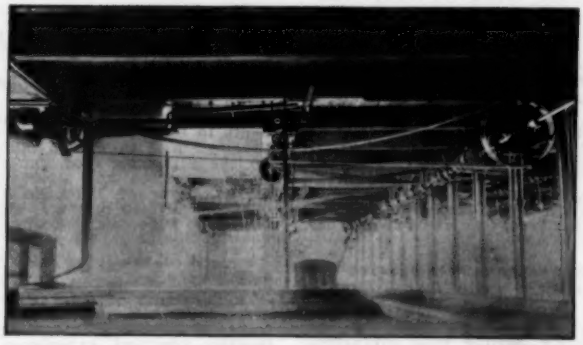
Decidedly the best work of the kind for a proper understanding of the present state of the art of dyeing, for the use of practical dyers, manufacturers and students. It takes up such subjects as, Water; Acids; Alkalies; Mordants; Natural and Artificial Coloring Matter; Machinery used for dyeing, etc. Has numerous illustrations and specimens of dyed fabrics. Price $15.00.

Draw Frames and Fly Frames. By Thomas Thornley, 380 pages.

This is the only work especially devoted to the drawing and roving processes, and is intended to benefit those who are directly concerned in the practical operation of the machines under discussion, with particular stress on the points which will give the best results from machines in their actual manipulation. Among the subjects treated may be mentioned the following: Drawing Frames; Fly Frames—Winding, Building Motion, Differential Motions; Roller Setting and Drawing; Defective Roving Bobbins; How to Put up Frames; etc. Price, $2.00.

Cotton. By Christopher P. Brooks, 384 pages, 174 illustrations.

This is the most acceptable book on this subject that has been published. The subject has been presented in a remarkably attractive style, and is treated in a manner not to be found elsewhere. Cotton is considered in its botanical features, its cultivation, preparation for the market, and as an article of commerce. A full chapter is given on the commercial uses of the seed for oil, etc. It is a volume that will be of interest to the cotton factor, merchant, broker, and all whose business it is to buy or sell the fibre in its raw or manufactured condition. We cannot speak in too flattering praise regarding the merits of this book. Price $3.00.



PROVIDENCE, R. I., Dec. 15, 1899.

CLING SURFACE MFG. CO., N. E. Branch, Boston:

This 8 inch belt drives our machine shop. Being unable to photograph when running we clamped belt on pulleys to show all possible slack. There is more slack when running, than here shown, upper part dropping to 3 inch—4 inch of lower, yet drives perfectly. We think very highly of Cling-surface.

GORHAM MFG. CO., Silversmiths.

CLING-SURFACE stops all belts from slipping, allows upright belts to run easy, horizontal belts run slack, all have increased power, run evenly and become pliable and in perfect condition. Pay only if satisfactory. Ask for booklet of slack belts.

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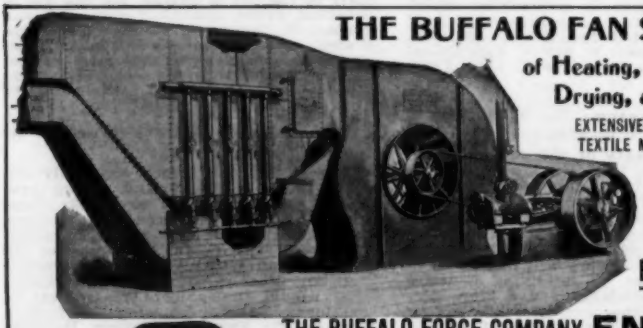
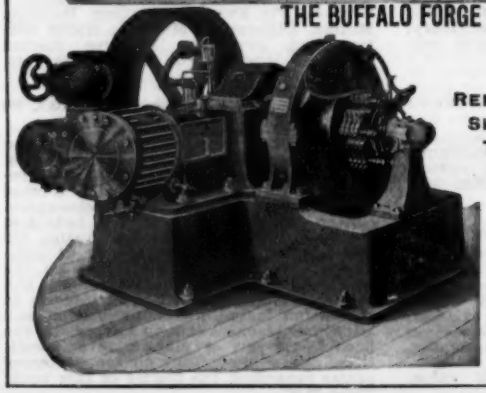


THE BUFFALO FAN SYSTEM
of Heating, Ventilating, Drying, and Cooling.
EXTENSIVELY USED IN TEXTILE MILLS.

The Buffalo Cotton Elevating Fans.



THE BUFFALO FORGE COMPANY ENGINE.

FIRST AWARD AND GOLD MEDAL AT OMAHA, 1898.

REFINEMENT OF REGULATION.
SIMPLICITY OF DESIGN.
THOROUGHNESS OF CONSTRUCTION.
EXCELLENCE OF FINISH.

Catalogue of all on application.

Buffalo Forge Company,
BUFFALO, N. Y., U. S. A.
New York. Cleveland. Chicago.

BUYERS' INDEX.

Advertisers whose names do not appear under desired headings will please notify the publishers. Such omissions are accidental, not intentional.

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Carpet Machinery.
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Howard, Geo. C., 1783 Barker St., Phila., Pa.

Chemicals and Apparatus.
Bullock & Crenshaw, 528 Arch St, Phila, Pa.
Roessler & Hasslacher Chemical Co, 100 William St, New York.

Chemist.
Adriance, John S., 105 East 39th St., New York.

Clutches.
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Coal, (Anthracite and Bituminous.)
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Commission Merchants (Dry Goods).
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Cotton Elevators.
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Cotton Machinery.
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Curtis & Marble Machine Co, Worcester, Mass.
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Easton-Burnham Co., Pawtucket, R. I.
Fairmount Machine Co, 22d and Wood Sts, Philadelphia.
Howard & Bullough American Machine Co, Pawtucket, R. I.
Kilburn, Lincoln & Co, Fall River, Mass.
Leigh, Evan A, 35 Mason Building, Boston.
Lowell Machine Shop, Lowell, Mass.
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Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia, Pa.
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Dextrine.
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Sargent's, C. G., Sons, Graniteville, Mass.
Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass.

Dusters.
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Dyers, Bleachers and Finishers.
American Yarn Printing Works, 134-150 North 22d St., Philadelphia.
Brophy's, T, Sons, Jasper St, Philadelphia.
Cohoes Dye Works, Cohoes, N. Y.
Cranston Worsted Mills (yarns), Bristol R. I.
Davidson & Brooke, 2560 No. 3d St., Philadelphia.
Duncan & Baillie, Cohoes, N. Y.
Firth & Foster Co, Kensington, Pa.
Greenwood, R. & Bault, Frankford, Pa.
Home Bleach & Dye Works, Pawtucket and Valley Falls, R. I.
Littlewood, G. J., & Sons, Manayunk, Pa.
Lorimers, The Wm. H. & Sons Co , Phila.
Molt Bros., Millbury, Mass. (Indigo Blue.)
New England Thread Co , Pawtucket, R. I.
Pawtucket Dyeing & Bleaching Co, Pawtucket, R. I.
Philadelphia Linen Finishing Co., Frankfort, Philadelphia.
Rowland, Samuel, Schuylkill Haven, Pa.
Warren, W, Thread Works, Westfield, Mass.

Dyeing, Drying, Bleaching and Finishing Machinery.
Birch Bros., Somerville, Mass.
Buffalo Forge Co., Buffalo, N. Y.
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Fairmount Machine Co, 22 and Wood Sts, Philadelphia.
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Knapp, C. H., Paterson, N. J.
Lincoln, The, Co, 54 Arch St. Hartford, Ct.
Parks & Woolson Machine Co., Springfield, Vt.
Peel, Samuel H. Germantown, Philadelphia Pa.
Phenix Iron Foundry, Providence, R. I.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia, Pa.
Philadelphia Textile Machinery Co, Hancock and Somerset Sts, Philadelphia, Pa.
Phillips, The Thomas Co, 91-95 South Main St, Providence, R. I.
Rusden Machine Co., Warren, R. I.
Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass. (Drying.)
Weihe, H. C. Philadelphia.
Woonsocket Machine & Press Co, Woonsocket, R. I.

Dye Sticks.
Bailey, Frank, Cedar Brook, New Jersey.
Haedrich, E. M., Philadelphia, Pa.

Dyestuffs and Chemicals.
American Aniline Co., 163 No. Front St., Philadelphia.
Anchor Color Mfg. Co, 464 Cherry St, New York.
Atteaux, F. E. & Co., 174-176 Purchase St Boston.
Berlin Aniline Works, 72 Front St., N. Y.
Bischoff, & Co, 87 Park Place, N. Y.
Bosson & Lane, 36 Central Wharf, Boston.
Corey, S. J, 273 Congress St, Boston.
Dillon & Co, 20 Cedar St, New York.
Farbenfabriken of Elberfeld Co, 40 Stone St, N. Y.
Geisenheimer & Co, 189 Front St, New York.
Innis & Co, 3 Cedar St, New York.
Jaeck Bros., The, Co., 62-68 No. 11th St, Brooklyn, N. Y.
Janney, O. S, & Co, Phila. and Boston.
Johnson, Chas. A, & Co, 22 Dey St, N. Y
Johnson, Wm. G, & Co, Uncasville, Conn.
Keller, John J, & Co, 104-106 Murray St, N. Y.
Klipstein, A., & Co, 122 Pearl St, N. Y.
Koechl, Victor, & Co, 122 Hudson St. N. Y.
Kuttroff, Pickhardt & Co., New York.
Matheson, W. J, & Co, 182-184 Front St, N.Y.
Merrimac Chemical Co, Boston, Mass.
Molt Bros., Millbury, Mass. (Indigo Blue.)
N. Y. & Boston Dyewood Co, 55 Beekman St, New York.
Oakes Mfg. Co, 93 Pearl St, N. Y.
Palmetto Co., The, 942-44 Drexel Building, Philadelphia.
Richmond & Foley, 235 N. Front St., Philadelphia.
Roessler & Hasslacher Chemical Co, 100 William St., New York.
Sharpless Dye Wood Ext. Co, The Bourse, Phila, Pa.
Stamford Mfg. Co, 133-137 Front St., N. Y.
Stone & Ware Co, The, 157 Maiden Lane. N. Y.
Sykes & Street, 85 Water St. N. Y
Thayer, Ed. M., 106 Broad St., Boston, Mass.

Dynamos.
Sturtevant, Co., B. F. Boston.

Edgings.
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Elastic Web Calendering Machines.
Knapp, C. H., Paterson, N. J.

Electrotyping and Printing.
Whitcomb, H. C, & Co, Boston.

Elevators.
Cohoes Foundry & Machine Co, Cohoes, N.Y.
Eastern Machinery Co, The, New Haven. Conn.
Jeffrey Manufacturing Co., Columbus, O.
Howard, Geo. C., 1783 Barker St., Phila., Pa.

Electric Fans.
Buffalo Forge Co., Buffalo, N. Y.
Sturtevant Co., B. F., Boston.

Electric Motors.
Sturtevant Co., B. F., Boston.

Engineers, Mechanical.
Berlin Iron Bridge Co., The, East Berlin, Conn.
Ferguson, John W, Paterson, N. J.

Fans—Exhaust and Ventilating.
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Feed Water Heaters.
Kelley, Benj. F. & Son, 91 Liberty S New York.

Feed Water Pumps.
Goulds Mfg. Co, Seneca Falls, N. Y.
Phœnix Iron Foundry, Providence, R. I.

Finishing Machinery.
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Fireproof Construction.
The Berlin Iron Bridge Co., East Berlin, Conn.

Fluted Rolls.
Cohoes Foundry & Machine Co, Cohoes, N.Y
Thurston, A. G, & Son, Box 526, Fall River Mass.

Forges.
Buffalo Forge Co., Buffalo, N. Y.
Sturtevant Co., B. F., Boston.

Friction Clutches.
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Friction Hoisting Drums.
Eastern Machinery Co., New Haven, Conn.

Fulling Mills for Woolen Goods.
Hopkins, Machine Works, Bridgeton, R. I.
Hunt, Rodney, Machine Co, Orange, Mass.
Hunter Jas, Machine Co, No. Adams, Mass.

Gas Engines.
Jones, Lewis, 60½ and Media Sts, Phila, Pa.

Gas Exhausters.
Sturtevant Co., B F., Boston.

Gas Singeing Machines.
Birch Brothers, Somerville, Mass.
Butterworth, H. W. Sons Co., Philadelphia.
Curtis & Marble Machine Co, Worcester, Ms.
Granger Foundry & Machine Co., Providence, R. I.
Rusden Machine Co., Warren, R. I.

Gear Cutting Machine.
Whiton, The D. E, Co, New London, Conn.

Generating Sets.
Buffalo Forge Co., Buffalo, N. Y.
Sturtevant Co., B. F , Boston.

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Heddles.
Watson, L. S, Mfg. Co, Leicester, Mass.

Hoisting Machinery.
The Eastern Machinery Co., New Haven, Conn.

Hose.
Boston Belting Co., Boston.

Hosiery Boards.
Pearson, J. T, Kensington, Pa.

Humidifying Apparatus.
American Air Moistening Co., Boston.

Hydro Extractors.
American Tool & Machine Co , Boston.
Rusden Machine Co., Warren, R. I.

Jacquard Card Boards.
Griffiths, Frank & Co., 2766 Ruth St., Phila.

Knit Goods Edgings, Trimmings, etc.
Cathcart, John & Co., 115 Franklin St., New York.
Cheney Bros, Silk Goods, 479 Broome St, N. Y.
Friedberger & Co, Edgings, Germantown Phila, Pa.
Hepner & Horwitz, Lacings, 30 Howard St, N. Y.
Krout & Fite Mfg. Co, Allegheny Ave. and Emerald St., Phila.
Weimar Bros, 1817 East York St, Phila. Pa.

Knit Goods Finishing Machines, Crochet, Etc.
Merrow Machine Co, The, Hartford, Conn.
Nye & Tredick, 606 Arch St, Phila, Pa.
Scott & Williams, 2079 E. Cumberland St, Phila Pa.

Knitting Machine Cylinders.
Paxton & O'Neill, 129 Bread St, Phila, Pa.
Stafford & Holt, Little Falls, N. Y.

Knitting Machinery.
Beattie, Wm. & Son, Cohoes, N. Y.
Branson Machine Co., 506 John St., Philadelphia.
Campbell & Clute, Cohoes, N. Y.
Cooper, Chas, Bennington, Vt.
Crane Mfg. Co, Lakeport, N. H.
Excelsior Knitting Machine Manufacturing Co., Allentown, Pa.
Fisher Knitting Machine Co., Utica, N. Y.
Franklin Transfer Co., Franklin Falls, N.H.
Hepworth & Co, Lehigh Ave. and Mascher St, Phila, Pa.
Jenckes, E. Mfg. Co, Pawtucket, R. I.
Jones, Lewis, 60 1-2 and Media Sts, Philadelphia, Pa.
Kennedy, Thos. (Cutters, etc.), Cohoes, N. Y.
Leighton Machine Co, Manchester, N. H.
Lindley, Geo. W., 5122 Wakefield St., Germantown, Pa.
Mayo Knitting Machine & Needle Co, Franklin, N. H.
McMichael & Wildman Mfg. Co, Norristown, Pa.
Nye & Tredick, 606 Arch St, Phila, Pa.
Paxton & O'Neill, 127 Bread St, Phila, Pa.
Pepper Mfg. Co, Lakeport, N. H.
Scott & Williams, 2079 E. Cumberland St., Phila., Pa.
Snyder, Homer P. Mfg. Co., Little Falls, N. Y.
Stafford & Holt, Little Falls, N. Y.

Knitting Needles and Supplies.
Breedon, Wm, & Son, Amsterdam, N. Y.
Cooper, Chas, Bennington, Vt.
Corey, Wm, Co, Manchester, N. H.
Crane Mfg. Co , Lakeport, N. H.
Dodge Needle Co., Manchester, N. H.
Ives, Loyal T. New Brunswick, N. J.
Lydall, H, & Fouids, Manchester, Conn.
Manufacturers' Supplies Co., 66 No. 4th St., Philadelphia.
Mayo Knitting Machine & Needle Co, Franklin, N. H.
Treat, Orion, Manchester Green, Conn.
Wardwell Needle Co, Lakeport, N. H.

Laboratory Outfits.
Bullock & Crenshaw, 528 Arch St. Phila, Pa

Looms.
Crompton & Knowles Loom Works, Worcester, Mass.
Draper Company, Hopedale, Mass.
Fairmount Machine Works, 22d and Wood Sts. Philadelphia.
Furbush, M. A, & Son Co, Phila, Pa.
Howard, Geo. C., 1788 Barker St, Phila Pa. (For wire.)
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Leigh, Evan A., 35 Mason Bldg., Boston.
Lowell Machine Shop, Lowell, Mass.
Mason Machine Works, Taunton, Mass.
Whitin Machine Works, Whitinsville, Ms,
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Lubricators.
Ameledema Oilless Bearing Co., Berkeley St , Wayne Junction, Philadelphia.
Dixon, Jos., Crucible Co, Jersey City, N. J.

Lumber.
Stearns, A. T, Lumber Co, Neponset, Mass.

Lumpers.
Gerry, George, & Son, Athol, Mass.

Machinery Dealers.
Jefferson, Ed, & Bro, 28 Strawberry St, Phila, Pa.
Schofield, Geo. L. Phila., Pa.

Machinery Wipers.
American Silk Mfg. Co., Philadelphia.

Machinists' Tools.
Whiton, The D. E. Co, New London, Conn.

Mails.
Walder, J. Paterson, N. J.

Mechanical Draft.
Buffalo Forge Co., Buffalo, N. Y.
Sturtevant Co., B. F., Boston.

Measuring and Folding Machines.
Curtis & Marble Machine Co, Worcester, Ms.
Elliott & Hall, 544 Hermon St, Worcester Mass.

Mercerizing Machinery.
Butterworth, H. W. & Sons, Philadelphia.
Granger Foundry & Machine Co., Providence, R. I.
Rusden Machine Co., Warren, R. I.

Mills For Sale.
Denny, R. B., 143 Federal St., Boston.

Mill Builders and Engineers.
Berlin Iron Bridge Co, The, East Berlin, Ct
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Mill Supplies.
American Supply Co, Providence, R. I.
Bamford & Smith, Pascoag, R. I.
Bristol, The, Co., Waterbury, Conn.
Buckley's, Benj. Son, Gun Mill, Paterson, N. J.
Dixon Lubricating Saddle Co., Bristol, R.I.
Easton Burnham Co., Pawtucket, R. I.
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Jefferson, Ed, & Bro, 28 Strawberry St, Phila, Pa.
Jeffrey Manufacturing Co., Columbus, O.
Thurston, A. G, & Son, Fall River, Mass.
Watson, L. S, Mfg.Co, Leicester, Mass.

Napping Machines.
American Napping Machine Co, Williamstown, Mass
Ardrey, S. B, & Sons, Bristol, Pa.
Curtis & Marble Machine Co, Worcester, Mass.
Jones, Lewis, 60 1-2 and Media Sts., Philadelphia, Pa.

Noils (Silk.)
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Packing.
Boston Belting Co , Boston.

Pantagraphs for Mill Engraving.
Johnson, C. A, & Co, 22 Dey St, New York.

Patterns of European Novelties.
European Pattern Supply Co., 530 Broadway, N. Y.
European Textile Sample Co., 56 Worth St., New York.

Patent Solicitors.
Crosby & Gregory, 34 School St, Boston, Mass.
Siggers, E. G., Washington, D. C.
Wright, Brown & Quinby, 53 State St, Boston, Mass.

Perforated Metal.
Beckley, A. J. & Co., Garwood, N. J.
Harrington & King Perforating Co., 230 North Union St , Chicago. Ill.

Peroxide of Sodium.
Roessler & Hasslacher Chemical Co., 100 William St, New York.

Picker Sticks.
Loom Picker Co., Biddeford, Me.

Picking, Carbonizing and Garnetting.
Garfield Woolen Co, Garfield, N. J.

Pipe Covering (Magnesia).
Keasby, R. A. 83 Warren St, New York.

Pneumatic Conveying.
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Power Transmitting Machinery.
Ameledema Oilless Bearing Co, 149 West Berkley St, Wayne Junction, Pa.
Channon, H, Co, 25 Market St, Chicago, Ill.
Christiana Machine Co., Christiana, Pa.
Eastern Machinery Co, New Haven, Conn.
Fairmount Machine Works, 22d and Wood Sts, Philadelphia.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Hunter, Jas, Machine Co, No. Adams, Mass.
Jeffrey Manufacturing Co., Columbus, O.
Kilburn, Lincoln & Co Fall River, Mass.
Link Belt Machinery Co, Chicago, Ill.
Rusden Machine Co., Warren, R. I.
Saginaw Manufacturing Co., Saginaw, Mich.

Presses.
Boomer & Boschet Press Co., 338 West Water St., Syracuse, N. Y.
Butterworth, H. W. & Sons Co., Philadelphia
Crawford, J. J, & Son, Nashua, N. H. (Power Screw, Hydraulic, Hollow Steam Plate.)
Curtis & Marble Machine Co, Worcester, Ms.
Hart, Charles, Frankford, Philadelphia.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Phillips Co, The Thomas, Providence, R. I.
Woonsocket Machine & Press Co, Woonsocket, R. I.

Printers and Embossers.
Novelty Textile Printing Co, 447-449 W. 14th St, New York.

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Pumps.
Goulds Mfg. Co, Seneca Falls, N. Y.
Rusden Machine Co., Warren, R. I.

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Parker, Henry, Co., Springfield, Vt.

Reed and Harness Manufacturers.
American Supply Co, Providence, R. I.
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Remnants.
Schloss' Son, N. J. & Co., 594 Broadway, N. Y.

Ribbons.
Cheney Bros, S. Manchester, Ct.

Roofing Asphalt.
Warren Bros. Co., 143 Federal St., Boston.

Roofing, Gravel, Slag and Composition.
Armitage Mfg. Co, Richmond, Va.
Eastern Granite Roofing Co., Jersey City N. J.

Roofing, Paint and Paper.
Armitage Mfg. Co, Richmond, Va.
Warren Bros. Co., Boston, Mass.

Roving Cans and Sheet Metal Work for Mills.
N. E. Ventilating & Heating Co, 930 Manton Ave, Providence, R. I.
Laminar Fibre Co., No. Cambridge, Mass.
Walrus Fibre Mfg. Co., Medford, Mass.

Rubber Squeeze Rolls,
Clark, Geo. P. Windsor Locks, Conn.

Rubber Covered Rollers and Goods.
Boston Belting Co., Boston.

Saddles and Stirrups.
Dixon Lubricating Saddle Co., Bristol, R. I.

Schools.
American Correspondence School of Textile, New Bedford, Mass.
Lowell Textile School, Lowell, Mass.
Philadelphia Textile School, Phila, Pa.

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Sewing Machines and Supplies.
American Machine Co., 420 Library St., Phila.
Birch Bros., Somerville, Mass.
Curtis & Marble Machine Co, Worcester, Mass.
Industrial, The, Mfg Co., Camden, N. J.
Manufacturers' Supplies Co., 66 No. 4th St., Philadelphia.
Nye & Tredick, 606 Arch St, Phila, Pa.
Rusden Machine Co., Warren, R. I.
Standard Sewing Machine Co, Cleveland, Ohio.
Scott & Williams, 6th and Arch Sts, Phila, Pa.

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Shell Rolls.
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New Bedford Copper Co, New Bedford, Mass

Sizing, Starch and Gums.
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Whitin Machine Wks, Whitinsville, Mass.

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Spinning Cylinders.
N. E. Ventilating & Heating Co, 930 Manton Ave, Providence, R. I.

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See Cotton Machinery.

Spinning Frames for Wool
Woonsocket Machine and Press Co., Woonsocket, R. I.

Spinning Rings.
Draper Company, Hopedale, Mass
Morley Button Mfg. Co., Boston, Mass.
Whitinsville Spinning Ring Co, Whitinsville, Mass.

Spinning Tubes.
Buckley, Benj's. Son, Gun Mill, Paterson, N. J.

Spools. *See Bobbins, Spools Shuttles, Etc.*

Sprinklers.
International Sprinkler Co., Philadelphia, Pa.

Stamps and Checks.
Michael, A. M. Albany, N. Y.

Steam Boilers.
Brown, C. H, & Co, Fitchburg, Mass.
Lee-Odlum Co., Memphis, Tenn.

Steam Boiler Compound.
Straus & Co., 53 Broad St., New York.

Steam Boiler Insurance.
Hartford Steam Boiler Inspection & Insurance Co, Hartford, Conn.

Steam Engines.
American Blower Co., Detroit, Mich.
Brown, C. H, & Co, Fitchburg, Mass.
Buffalo Forge Co., Buffalo, N. Y.
Hooven (The), Owens & Rentschler Co, Hamilton, O.
Rusden Machine Co., Warren, R. I.
Sturtevant, B. F. & Co., Boston.

Steam Specialties.
Butterworth, H. W. Sons Co., Philadelphia.
Rusden Machine Co., Warren, R. I.
Sturtevant Co., B F., Boston.

Tanks, Tubs and Vats.
Caldwell Co., W. E. 202 Brook St., Louisville, Ky.
Corcoran, A. J, 11 John St, New York.
Cypress Lumber Co, Apalachicola, Fla.
Lee-Odlum Co., Memphis, Tenn.
Rusden Machine Co. Warren, R. I.
Stearns, A. T, Lumber Co, Neponset, Mass.
Woolford, George, 2240 No. 9th St, Phila, Pa.

Tapes, Braids and Edgings.
Cathcart, John, & Co, 115 Franklin St, N. Y.
Friedberger Mfg. Co, Germantown, Pa.
Hamilton, J. H , & Co, 275 Church St, N. Y.
Krout & Fite Mfg. Co., Allegheny Ave. and Emerald St., Philadelphia.
Weimar Bros, 1817 East York St, Phila, Pa.
Young, Wm. M, 3638-40 Frankford Ave, Philadelphia, Pa.

Telephones.
Mianus Electric Co., Mianus, Conn.
Plummer, F. O. 620 Atlantic Ave., Boston.

Tentering Machines.
See Dyeing, Bleaching Machinery, Etc.

Tension Pulleys.
Ameledema Oilless Bearing Co., Wayne, Junc., Phila. Pa.
N. E. Ventilating & Heating Co, 930 Manton Ave, Providence, R. I.

Testing Machines.
Howard, Geo. C., 1733 Barker St., Phila., Pa

Thermometers, Hygrometers, Etc.
Neubeck, Aug. & Co., 92 Fulton St., N. Y.

Towers.
Caldwell Co., W. E. 202 Brook St., Louisville, Ky.
Lee-Odlum Co., Memphis, Tenn.

Trimmers.
The American Machine Co., 420 Library St., Philadelphia.

Trucks.
Armstrong Truck Co., Philadelphia.

Turbines.
(See Water Wheels.

Valves—Rubber.
Boston Belting Co., Boston, Mass.

Ventilating Apparatus.
Allington & Curtis Mfg. Co., Saginaw, Mich., 81 Wareham St., Boston.
American Air Moistening Co., Boston.
American Blower Co., Detroit, Mich.
Berger Bros. Co., 231-237 Arch St., Philadelphia.
Berry, A. Hun, 23 W. 1st St, Boston, Mass.
Buffalo Forge Co., Buffalo, N. Y.
Gosline, D. P., Boston.
Mattern, Geo. 44 East 8th St., New York.
New England Ventilating & Heating Co, Providence, R. I.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philapelphia.
Philadelphia Textile Machinery Co, Hancock St, above Lehigh Ave, Phila, Pa.
Sargent's, C. G., Sons, Graniteville, Mass.
Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass.

Washers (Cloth).
Birch Brothers, Somerville, Mass.
Butterworth, H. W. & Sons Co., Philadelphia.
Hopkins, Machine Works, Bridgeton, R. I.
Hunt, Rodney, Machine Co, Orange, Mass.
Hunter, Jas, Machine Co, No. Adams, Mass.
Phillips Co, The Thomas, Providence, R. I.
Rusden Machine Co , Warren, R. I.

Watchman's Clock.
Eco Magneto Clock Co, 620 Atlantic Ave, Boston.
Nanz & Co, 127 Duane St., New York.

Water Wheels.
Bradway, C. P., W. Stafford, Ct.
Christiana Machine Co., Christiana, Pa.
Hunt, Rodney, Machine Co, Orange, Mass.
Leffel, James, & Co, Springfield, O.

Water Wheel Governors.
Bradway, C. P, West Stafford, Ct.
Cohoes Foundry & Machine Co, Cohoes N. Y.
Leffel, James & Co, Springfield, Ohio.
Lombard Water Wheel Governor Co, 61 Hampshire St, Boston.

Winders. (Hosiery.)
Universal Winding Co, 226 Devonshire St, Boston.

Wood Pulleys.
Saginaw Manufacturing Co, Saginaw, Mich.

Wool Cleaning Compound.
India Alkali Works, Boston.

Wool Combing Machinery.
Crompton & Knowles Loom Works, Worcester, Mass.
Leigh, Evan A. 35 Mason Bldg., Boston.

Wool Extracts.

Garfield Woolen Co, Garfield, N. J.

Wool and Waste Dusters.

Gerry, Geo, & Son, Athol, Mass.
Sargents', C. G., Sons, Graniteville, Mass.
Stillman-Randall Machine Co, Westerly, R. I.

Woolen and Worsted Machinery.

Altemus, W. W, & Co, 2816 N. 4th St, Phila Pa.
American Tool and Machine Co., Boston.
Birch Brothers, Somerville, Mass.
Butterworth, H. W. sons Co., Philadelphia.
Curtis & Marble Machine Co, Worcester, Mass.
Fairmount Machine Works, 22d and Wood Sts, Philadelphia.
Furbush, M. A. & Son Machine Co, Phila, Pa.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Hunt, Rodney, Machine Co, Orange, Mass.
Hunter, Jas, Machine Co, No. Adams, Mass.
Hunter, Robert 1525 Clearfield St., Frankford, Phila.
Jefferson, Ed, & Bro, 28 Strawberry St, Phila, Pa.
Kenyon D. R. & Son, Raritan, N. J.
Leigh, Evan A. 35 Mason Bldg, Boston.
Lombard, N. A. & Co., Worcester, Mass.
Parks & Woolson Machine Co., Springfield, Vt.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia.
Philadelphia Textile Machinery Co., Hancock and Somerset Sts., Philadelphia.
Phillips Co. The Thomas, Providence, R. I.
Roy, B. S. & Son, Worcester, Mass.
Rusden Machine Co., Warren, R. I.
Sargent's, C. G., Sons, Graniteville, Mass.
Schofield, Geo. L., Philadelphia.
Smethurst, Geo. (Gears for Mules), Maynard, Mass.
Stoddard, Haserick, Richards & Co, Boston, Mass.
Woonsocket Machine & Press Co Woonsocket, R. I.

Wool, Hair and Noils.

Becker, Chas. W, Agt, Amsterdam, N. Y.
Fowles & Co, 106 Church St, Phila.

Wool Shoddies.

Becker, Chas. W, Agt, Amsterdam, N. Y
Garfield Woolen Co, Garfield, N. J.
Slack, Wm. H. B., & Bro, Springfield, Vt.

Wool Washing, Preparing and Drying Machinery.

Hunter, Jas. Machine Co., No. Adams, Mass.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia.
Phillips Co, The Thomas, Providence, R. I.
Sargent's, C. G, Sons, Graniteville, Mass.

Woolen Commission Merchants.

Hayes, O. H. & Co., New York.

Yarns, Threads, Etc.

Banding.

Frost, Geo. T, Paterson, N. J.
Moore, C. & Co. 12 S. 5th St, Phila, Pa.
Warren, W, Thread Works, Westfield, Mass.
Solis, Andrew J, Jr, & Co, 179 Devonshire St, Boston, Mass.
Tucker & Cook Mfg. Co, Conway, Mass.
Whittier Cotton Mills, Lowell, Mass.

Cotton Yarns.

American Cotton Yarn Exchange, 67 Chauncy St., Boston.
Catlin & Co. New York and Boston.
Cohannet Mills, Taunton, Mass.
Eddy & Street, Providence, R. I.
Spring St., N. Y.
Eichmann & Sternberg, New York.
Germantown Spinning Co, Germantown, Pa.
Grant Yarn Co, Fitchburg, Mass.
Greene & Daniels Mfg. Co, Pawtucket, R. I.
Indian Orchard Co., Indian Orchard, Mass.
Jenckes, E., Mfg. Co., Pawtucket, R. I.
Mitchell, Jas. E, & Co, Boston and Phila, Pa.
Montgomery, J. R, Co, Windsor Locks, Ct.
Monument Mills, Housatonic, Mass.
New England Thread Co., Pawtucket, R. I.
Orswell Mills, Fitchburg, Mass
Tucker & Cook Mfg. Co, Conway, Mass.
Whittier Cotton Mills, Lowell, Mass.

Gassed Yarns.

Eichmann & Sternberg, New York.
Greene & Daniels g. Co, Pawtucket, R. I.

Glazed Yarns.

Indian Orchard Co., Indian Orchard, Mass.
Lorimers, Wm. H. & Son Co., Philadelphia.
Malcolm Mills Co, Frankford, Pa.
Montgomery & Co, J. R, Windsor Locks, Ct.
New England Thread Co., Pawtucket, R. I.
Warren, W, Thread Works, Westfield, Mass
Whittier Cotton Mills, Lowell, Mass.

Harness Twines.

Cranston Worsted Mills, Bristol, R. I.
Fawcett, Hughes, 115 Franklin St., N. Y.
Moore, C., & Co., (S. W. cor. 5th and Market Sts.)
Warren, W, Thread Works, Westfield, Mass
Whittier Cotton Mills, Lowell, Mass.

Hosiery and Knitting Yarns.

Boyer, B. F, & Co, Camden, N. J.
Campbell, Geo. & Co, Phila, Pa.
Champlain Silk Mills, Whitehall, N. Y.
Clark, Wm, Co, Westerly, R. I.
Cohannet Mills, Taunton, Mass.
Cranston Worsted Mills, Bristol, R. I.
Germantown Spinning Co, Germantown, Pa.
Greene & Daniels Mfg. Co, Pawtucket, R. I.
Hyde, E. S, 223 Chestnut St, Phila, Pa.
Jenckes, E., Manufacturing Co, Pawtucket, R. I.
Mitchell, James E, & Co, Phila. and Boston
Monument Mills, Housatonic, Mass.
Orswell Mills, Fitchburg, Mass.
Skerry, A. T, & Co, 47 Leonard St, N. Y.
Walcott & Campbell Spinning Co, New York Mills, Oneida Co, N. Y.
Warren, W, Thread Works, Westfield, Mass
Whittier Cotton Mills, Lowell, Mass.

Flax, Hemp, Jute and Ramie.

Fawcett, Hughes, 115 Franklin St., N. Y

Mohair Yarns.

Cranston Worsted Mills, Bristol, R. I.
Skerry, A. T, & Co, 47 Leonard St, N. Y.

Novelty Yarns, Tinsels, Silk Noils, Etc.

Champlain Silk Mills, Whitehall, N. Y.
Cranston Worsted Mills, Bristol, R. I
Indian Orchard Co., Indian Orchard, Mass.
Malcolm Mills Co, 229 Chestnut St, Phila, Pa
Montgomery & Co, J. R, Windsor Locks, Ct.
Skerry, A. T, & Co, 47 Leonard St, N. Y.

Silk Yarns.

Champlain Silk Mills, Whitehall, N. Y.
Cheney Bros, S. Manchester and Hartford Ct.
Eddy & Street, Providence, R. I.
Ryle, Wm, & Co, 54 Howard St, N. Y.

Woolen and Merino Yarns.

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Eddy & Street, Providence, R. I.
Hyde, E. S, 223 Chestnut St, Phila, Pa.
Jenckes, E. Mfg. Co., Pawtucket, R. I.
Skerry, A. T, & Co, 47 Leonard St, N. Y.
Solis, Andrew J, Jr, & Co, 179 Devonshire St, Boston, Mass.

Worsted Yarns.

Alleghany Worsted Mills, Phila, Pa.
Boyer, B. F, & Co, Camden, N. J.
Campbell, Geo. & Co, Phila, Pa
Campion, Richard, 17 Bank St., Philadelphia.
Cranston Worsted Mills, Bristol, R. I.
Croft, Howland, & Sons, cor. Broadway and Jefferson Ave., Camden, N. J.
Herbst & Jones, 21st and Naudain Sts Philadelphia, Pa.
Pocasset Worsted Co., Thornton, R. I.
Skerry, A. T, & Co, 47 Leonard St, N. Y.
Solis, Andrew J, Jr, & Co, 179 Devonshire St, Boston, Mass.
Waverly Worsted Co, Main St. and Green Lane, Manayunk, Pa.

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—In these days of keen competition and narrow margins, the cotton trade could not be conducted at all if mismanaged so wastefully as in former years.

—In the wool manufacture the tendency towards associated or combined business methods is distinctly of English origin.

—If very hard silk be required, all the gum is left in it; then it is as hard and wiry as the hair in a horse's tail.

—Recently a movement has been under way to bring the fine wool combers of the Bradford district—that is, 60s and crossbreds—into a combination.

—A German patent has recently been granted for resisting developed azo-colors by means of caustic alkali printed on the prepare.

—It is well known by students of weaving that a pile or plush effect is obtainable on various systems, which come under two great classifications, namely, warp and weft pile fabrics.

—Goats do not require much water, and rarely drink more than 1½ or 2 pints at a time, and in winter considerably less.

—Angora goats, like sheep, belong to the ruminants. Though they like a variety of food, they live principally upon leaves and young and tender bark and twigs of bushes and small trees.

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Telephone 3744 Cortlandt.

PECIAL NOTICE TO COTTON MILL EXPERTS.

Waco is ready to subscribe $100,000.00 for a cotton mill, but before doing so would like to correspond with experienced men who thoroughly understand managing, controlling and running a cotton mill in all its branches and who would be willing to take 10 or 15 per cent of the stock of the company, and come to Waco to superintend the mill.

Waco being in the centre of the state this is a fine opening for an up to date mill.

Parties interested will please address, Mr. S. Hirschberg, chairman mill committee, Waco Business Men's Club, Waco, Texas.

SPECIAL PROCESS FOR MAKING LOW UNION GOODS.

English manufacturer recently come to this country has a special process of manufacturing woolen cloth from all rag stock without any cotton or wool. Would like to to obtain a position as superintendent in some woolen mill where this process can be introduced, and which should show a large profit. Is an all around woolen manufacturer from Leeds, and thoroughly familiar with all departments in woolen mill. Could take charge of shoddy mill. Salary moderate. Address,

W. R. care of TEXTILE WORLD.

SPOOLERS WANTED.

Doubling spooler for filling braider bobbins, also Swift spooler for winding soft cotton yarns. Address, Sun, care of Textile World.

DESIRABLE MILL PROPERTY FOR SALE.

Four set Woolen Mill, practically all buildings new. Water power, engine, boilers, shafting, dynamo, water wheel, etc., in complete running order. Apply, **Newburgh Woolen Mills, Newburgh, N. Y.**

Woolen Spperintendent Wanted.

A mill in Indiana wants a Superintendent for shoddy plant. One who has had experience in buying, grading and sorting rags, and is capable of taking full charge. If a man had some capital to invest, would give him an interest in the business later on, if everything proved satisfactory. Address, Volentine, care of Textile World.

Boss Weaver Wanted.

We are in need of a machinest and loom boss, who thoroughly understands and is experienced in **handling all classes of tapes.** Steady employment. In Philadelphia. Competent persons only address, **"Tapes" care of Textile World, Boston.**

MADISONVILLE, KY. WANTS

A first-class cotton mill. Will give land, free fuel for five years, and exempt from city taxes for five years. Address, C. E. MORTON.

Coal Lands, Town Site, For Sale.

10,000 acres of best coal lands. Fine location for a thriving town. Wish to confer with any who are seeking first-class investments; or with a reliable promoter. None others need apply. Address, C. E. MORTON, Madisonville, Ky.

Experienced Operator

Wanted on elastic hosiery frams, fine position and climate for man with weak lungs. Address, W. W. SWEENEY & CO., Los Angeles, Cal.

SILK RIBBON SUPT. OR ASST. SUPT. WANTED.

I want a man of experience, ability and character, a man who *thoroughly* understands the manufacture of silk ribbons, and that has some knowledge of the manufacture of silk piece goods. This is an opportunity for the right man to better himself in good shape. All correspondence will be treated as strictly confidential. The right man will, if capable, be given an interest in the business, also will be given every opportunity to prove his worth. Address, G. T. W., care of Textile World.

Woolen Mill Man Wanted.

Thoroughly competent and experience woolen mill man wanted to correspond with Secretary Manufacturers' Association, Portland, Oregon, concerning establishment of a three set woolen mill at Portland. Must be thoroughly qualified business man as well as practical woolen mill man, and must have some capital. Correspondence invited.

—Established 1872.—

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One set of 60-inch Cleveland Cards.
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One Smith Garnett Machine.

One Dobbins Steam Screw Power Press (16 hollow plates.)

Several hundred Payne Cone Winder Bobbins. Sturtevant Fan.

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PAWTUCKET, R. I.

GIBSON'S RECIPES.

Mrs. Gibson has consigned to us for sale all the original books of recipes with samples attached prepared and used by Richard Gibson, covering the entire period of his long career in the dyehouse as one of the foremost American dyers. Some of the recipes are doubtless very valuable. There are several large books and a number of smaller ones, papers, memoranda, etc. Mrs Gibson thinks she ought to get $100 for the lot. We think so too. The sample books, etc. may be examined at our office by interested parties. The entire amount goes to Mrs. Gibson. She informs us that there are no more copies of her husband's printed books to be had.

TEXTILE WORLD,
620 Atlantic Ave., Boston, Mass.

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or other manufacturing enterprises. 750 H. P. on Dan River developed and ready for use immediately on Southern Railway. 130 acres land. Will sell or with proper parties will take stock in good enterprise.

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To sound industries substantial inducements will be given by many of the places concisely described in the pamphlet "100 Cities and Towns Wanting Industries." Write for a copy. Nearly all kinds of industries are wanted. Very liberal inducements are offered **Textile Industries** in the South by a number of good places GEORGE C. POWER Industrial Commissioner I. C. R. R. Co., Chicago.

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Full Fashioned Flat Frames.

Address, stating experience and salary. "CHURCH," care of Textile World.

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Steady and remarkable success has attended the mills located on the Southern. It is the great Textile Line of the South. Mill Men and Mill Investors should investigate the advantages our districts afford.

We have now a number of excellent points for new Cotton Mills, or for Knitting Mills, where local capital will join with that from the North in new enterprises. If you are interested, write us.

M. V. RICHARDS,

Land and Industrial Agent, Southern Railway,

Washington, D. C.

SITUATIONS WANTED.

The advertisers in the following columns should be addressed in care of TEXTILE WORLD or inquiries concerning them may be addressed directly to "Information Department TEXTILE WORLD," as full particulars of each advertiser are on file, and the addresses of suitable agents, superintendents and foremen for every branch of the textile industry will be furnished to manufacturers.

Any subscriber may file his application, and no charge is made until position is secured.

The business of this department is held strictly confidential.

The applications of good overseers in every department, who are in want of positions, are solicited.

Manufacturers are invited to use this department when in need of skilled men; each case will be handled confidentially, with promptness and judgment, and without charge to manufacturers.

A member of the firm is in charge of this department, and gives personal attention to each case.

WOOLEN SUPERINTENDENTS.

1682 **Supt. & Designer,** or would take a position as designer and asst. supt. in a good mill at $1200 per year. Has had 14 years' experience in woolen and worsted mills from pattern weaver, loom fixer, boss weaver, designer. Men's wear, wool and worsteds and dress goods. Best of references.

880 **Supt. or Assistant Supt. and Designer.** Over 25 years' experience as supt. and designer. Has designed and manufactured nearly all classes of goods made in a woolen mill, in wool and worsted, such as shawls, blankets, beavers, kerseys, cheviots, fancy cassimeres, overcoatings, worsted suitings, etc. 53 years old; married, with family. Would go West or nearly anywhere. Wants a mill where he can permanently settle and give them the benefit of his experience as a manufacturer. A first-class man.

1683 **Woolen Supt.** Large experience. Last mill where he was employed was for five years overseer and 15 as superintendent. A good man on flannels, sackings, skirtings, woolen dress goods and domestic woolen goods. Well up in weaving, dyeing, carding, etc., and has a general knowledge of all departments in a Western woolen mill. Englishman; married. Refers to past employers.

1674 **Supt.** or assistant in woolen mill. 10 years' experience on cassimeres, cloakings, etc. Well posted on shoddies. First-class references. Strictly temperate. Age 29; American; single.

1386 **Woolen Superintendent or** Boss Carder. Age 43; American. Familiar with the manufacture of all kinds of woolen goods, is well recommended, and can go immediately.

1606 **Woolen Supt.** 24 years' experience as supt. and manager. Several years manager of his own plant. At present out of position owing to consolidation. Would make a successful manager of a moderate sized plant, making plain or fancy cassimeres, doeskins or felt goods. Best of references.

1610 **Woolen Supt. or Dyer.** Large experience as dyer and assistant supt. on broadcloths, kerseys, dress goods and men's wear. Age 36; American, married.

935 **Woolen Supt. and Designer.** Graduate of German Textile School. Has managed successfully two mills in the West. Thoroughly up on designing and general mill management. Age 35. Married. References first-class.

COTTON SUPERINTENDENTS.

189 **Cotton Superintendent** wants position in Northern mill. Has been in charge of Southern mills for 7 years. Previous experience in N. E. Is well known among mill men, and can furnish the best of references. Age 35; married.

1686 **Cotton Supt.** Age 53; American; married. Large experience. Been in present position as superintendent for a number of years and previously in the same mill as overseer of weaving. Nearly all kinds of goods. Is familiar with nearly all makes of machinery. Refers to past employers.

1608 **Supt. of Yarn Mill.** A young man, 30, married, and competent to fill a good position with credit. Honest, temperate and excellent business training and judgment. Thorough manager and salesman, and keenly alive to conditions of today.

1371 **Supt. or Manager.** Age 25; single. Wishes to obtain a position in the South, Georgia preferred. Can accept position at once. Has had experience on all kinds of cotton hose and half hose. Strictly temperate. Good certificates.

1689 **Supt. or Assistant Supt.** Age 37; American; married. Large experience as overseer and first-class references. At present employed as overseer, but is capable of filling a superintendent's position. Worked on prints, twills, sheetings, cambric and fancies.

1653 **Supt.** of a small mill, or overseer of carding and spinning in a large mill. Has had seven years' experience as overseer and supt. in good mills. Is thoroughly posted on both gray and colored work. Has a thorough knowledge of designing, and understands all makes of machinery. Married, and good habits. At present employed as assistant superintendent in the South.

1673 **Cotton Supt., Carder, and Spinner.** Age 23; English; single. Large experience in English mills. Can take position at once. Has worked on all kinds of cotton machinery.

1671 **Supt.** desires position in Southern States as supt. of cotton mill or overseer in large room, any department. Age 42; married. Has had experience on all classes of white and colored work, both North and South. Has been South twenty years. At present employed, but wants better position. Best of references.

1432 **Desires Position as Superintendent** of cotton mill, or would take overseer of carding in large mill, where good wages can be secured. Age 31; married.

WOOLEN CARDERS.

1677 **Woolen Carder.** Worked on cotton, wool and shoddy, also worsteds. Age 33; American; married. Has had about nine years' experience. At present employed as overseer, but wishes a larger salary. Worked on all different makes of machinery. Excellent references.

1082 **Boss Woolen Carder.** Has had many years' experience, working as second-hand ten years with one of the best known carders of today, and has made a study of imperfections in the card room and how to remedy them. Has been boss carder in present mill five years, which is now shut down settling up estate, and if an opportunity was offered him before it was started, would accept. Best of references. Age 32; married. Underwear and hosiery yarn.

1630 **Boss Carder or Comber.** 10 years' experience as second-hand of carding and combing. Would like to secure an overseer's position at $3.00 a day. Has worked on all grades of foreign and domestic wools and is highly recommended by present and past employers. Englishman; age 25, married.

1643 **Woolen Carder.** Age 45; American; married. Has worked as overseer in first-class N. E. mills for the past 18 years. He is at present employed, but wishes to better himself. Could leave on a week's notice. Has worked on cassimeres, dress goods, flannels and underwear. A good manager of help and thoroughly competent and reliable.

1660 **Overseer Carding.** Does not want to go out of N. E. States. Age 48; American, married. Many years' experience as overseer, and has excellent references. Has worked on nearly every class of goods manufactured in N. E., and is familiar with nearly all machinery.

1638 **Boss Woolen Carder.** Long experience in N. E. mills on both high and low grades. Would consider $3 a day. Excellent references.

COTTON CARDERS.

1403 **Cotton Carder** with 17 years experience in N. E. mills as overseer and second hand, now in the South but wants to return North. Has never worked for less than $3.00 but would take $2 50 to change. Married. Age 38. Best of references.

1593 **Overseer Cotton Carding and Combing.** Now in charge of this department in a large N E. mill. Has had first-class experience and is well recommended. Age 38; married, American. All grades of cotton.

1320 **Boss Cotton Carder.** Has been overseer for 12 years Is at present employed, but desires to change for good reasons Would accept $2 50 a day. Age 40; American, married.

1596 **Cotton Comber and Carder.** Young man with 10 years' experience in N. E. mills. Would like position as overseer or second-hand. Is well recommended. Married. Will start at $2.50 per day.

1662 **Overseer Cotton Card Room.** Age 53; American, married. Not employed at present and could take a position at once. Has worked on all kinds of goods in order mills, and is familiar with all kinds of machinery. Refers to former employers.

WOOLEN SPINNERS.

1648 **Boss Woolen Spinner.** 47 years old. 28 years' experience. Worked on all kind of stock, from ¼ to 12 run. Temperate, steady, and refers to past employers. Will work for moderate salary. Not employed and could come at once. Experience on cassimeres, flannels, beavers, knit goods dress goods, blankets, shawls.

1519 **Overseer of Woolen Spinning.** Age 31; married. Has worked on yarns from 1 run down to 5¼. Some experience on shoddy. Will work for moderate salary.

1646 **Overseer Spinning or Spinning and Twisting.** Age 38; English, married. Worked in mill in England 13 years and in this country three years as second-hand and two years overseer in N. E. mills. At present employed, but wishes to change to get family better positions. Experienced on worsted yarns, camel hair, mohair, carpet and silk yarns

1595 **Overseer Worsted Spinning.** 10 years as overseer of spinning, twisting, reeling, dressing, spooling on worsted yarns Englishman; age 41, married. Now employed, but does not like section of country. A first-class man in every respect.

678 **Woolen Spinner.** 18 years' experience as overseer of spinning and carding. Can handle both departments. Would take position in the West. Best of references. Age 43; married

1601 **Woolen Spinner or Second-hand.** Experience in hosiery and cloth mills. Will accept small wages to get started in satisfactory position.

COTTON SPINNERS.

1647 **Overseer Cotton Mule Spinning.** Seven years' experience as second-hand. Wishes to get an overseer's job. Prefers Mason mules. Age 38; Catholic, married. At present employed Experience on prints, sateens, lawns, twills, etc Will work for moderate salary.

1655 **Overseer of Cotton Spinning.** 42 years old; married. Experience as a spinner covers a period of 30 years in first-class N. E. mills. Has worked principally on fine yarns, 30's to 200's. Had some experience on coarse numbers. First-class references.

1364 **Mules or Frames.** 34 years old; married. Thoroughly understands all makes of English and Mason mules. Has set up machinery and been expert fixer. Wants good position as overseer of mule room, or would take charge of frames. Accept $3.50 per day. Best references.

1663 **Overseer Mule Room.** Eleven years' experience in Fall River mills, and for the past ten years overseer of mule room. Excellent reference from present employer. Age 44, married.

1690 **Cotton Mule Spinner.** Age 42; French; married. Has worked on prints and sheetings and on yarns from 9's to 50's. First class references. Two years' experience as second-hand and five as overseer. Wants $2.50 per day to start with.

1592 **Overseer Cotton Ring Spinning.** Has worked his way up from back boy to second-hand in large N. E. mill, and has recommendations showing him to be capable of handling a room. American; age 40, married Would require two weeks' notice Will start at $3 a day.

WOOLEN WEAVERS.

1654 **Boss Woolen Weaver.** Has had 12 years' experience as fixer and two years' a boss weaver. Has worked on fancy worsteds, cotton worsteds and coverts. Is familiar with Crompton & Knowles machines. Age 37; English, married. At present employed. Can take a position with two weeks' notice.

1482 **Weaver or Wool Sorter.** Has worked on cassimeres, cheviots, tricots, kerseys and cloakings. Good references.

1645 **Overseer Weaving.** Age 30; married, American. Has worked in weave room since he was 17 years old as weaver, fixer and secondhand of weaving, except for a short time was traveling salesman. Has worked on ladies' dress goods, men's fine worsted suitings, overcoatings, cloakings, etc., on Crompton & Knowles and Jacquard looms. Excellent references.

1679 **Boss Weaver.** Age 35; Scotch; married. Worked on fancy worsteds, cassimeres, kerseys, beavers, etc., cloakings and dress goods. Has had experience in first class N. E. mills. Excellent references from past employers. Now out of employment. Wants position at once.

886 **Boss Weaver or Boss Weaver and Assistant Supt.** Age 46; married. Has had large experience, and worked on cassimeres, cloakings and dress goods. Had been in last position, in charge of weaving, for eight years.

1688 **Overseer of Weaving** in large mill, designer in small mill, or assistant designer in a large mill. Age 38; German; single. Has worked on beavers, chinchillas, fine cassimeres, fine fancy worsteds, ladies' dress goods, army goods, union cassimeres and other classes of goods. Strictly temperate and industrious.

COTTON WEAVERS.

1681 **Overseer or Secondhand of Cotton Weaving.** Has had long experience as loom fixer, secondhand and overseer, and can furnish excellent references. Has also had charge of cloth hall and drawing departments. With one mill was 15 years.

1687 **Overseer of Weaving.** Age 30; Scotch; married. Has worked on taffetas, grogran, satins, serges and grenadines, all kinds of plain and fancy cottons and lenos. Is familiar with Crompton & Knowles and Whitin looms. Wants $4 per day.

1668 **Overseer of Weaving.** Age 41; English; married. Has had large experience as loom fixer and secondhand of weaving, and is competent to take an overseer's job. Has worked on shirtings, sheetings, sateens, fancy lenos, and all grades of fine goods all the way from 2 to 28 harness.

1652 **Overseer Cotton Weaving.** Worked on about all kinds of cotton goods. Age 41, American, married. At present employed in the South, but wants to change for a healthier locality. Refers to present and past employers.

1665 **Overseer of Weaving** in small mill on plain work, or secondhand of same on plain or fancy in any mill. Age 32; American; married. Has worked on prints, light and heavy sheetings, 3 and 5 leaf twills, 5 leaf satteens, lenos, fancy dress goods, ginghams and lappets. Can furnish good references. Will work for moderate salary.

KNITTERS.

1084 **Overseer of Knitting and Finishing.** Age 35; married. Has just resigned position in the South on account of climate, and is ready to take place at once. Can furnish best of references.

1182 **Knitting Mill Supt.** A practical man, having had charge of each and every department in mill before becoming supt. Can furnish references as to character and ability. Wants to become associated with a reliable firm. Would take an interest in stock company starting a new mill. Is familiar with all makes of machinery and all classes of knit goods. Age 40; American; married.

598 **Boss Knitter or Supt.** Age 48; married. Is thoroughly familiar with the manufacture of all classes of seamless hosiery, and can take any position at short notice.

1492 **Boss Knitter.** Age 27; single; American. Worked in New York State mills. Is familiar with Campbell & Clute, Tompkins, McMichael & Wildman, Scott & Williams, Nye & Tredick machinery. Single and double plush work, balbriggan, etc.

1657 **Foreman Seamless Hosiery.** Age 39; American, married. At present employed, but can take a position at short notice. Has worked on cotton and woolen hosiery. Wants $4.00 per day.

1666 **Underwear Knitter or Supt.** 12 years' experience on ribbed underwear on all kinds of yarns. Has worked for present employer for six years. Age 40; American; married.

1631 **Hosiery Supt.** Has had charge of knitting departments in N. E. mills and has started several Southern hosiery mills. Experience covers cotton, wool and silk hosiery, gloves and mittens, and most all makes of machines. Very well recommended. Can take position at once.

DYERS.

1684 **Dyer.** Age 30. Been in business 12 years. Wants position at once. Will go anywhere. Is familiar with long chain, short skein and raw stock dyeing, and carpet warp.

1693 **Dyer.** English, of 30 years' experience on wool, fine worsted yarns, piece dyes, felt cloths, carpet yarns. Understands all the different kinds of indigo vats. Never yet been asked to show recommendations, never before being out of a position, only voluntarily. Would be willing to start in a small place and help to build it up. Understands making soap from all kinds of stock.

1680 **First-class Cotton Dyer.** Has had charge of piece dying in several of the largest bleacheries and dye works in the country, to all of which he refers. Is thoroughly familiar with cotton piece dyeing, both fancy and fast blacks, and is also a first class yarn dyer and has a general knowledge of bleaching and finishing. Understands mercerizing. 39 years old; married; American. Habits and record first-class.

1676 **Dyer,** or secondhand in a large mill. 11 years' experience. Age 35; English; married. Wools and piece dyed goods. Not at present employed. Can take position at once.

DESIGNERS.

1635 **Designer** on colored cotton dress goods, and shirtings, and fancy worsted dress goods, piece dye, jacquard work in cotton, silk filling, also lappets. Would not consider position paying less than $1200 a year. Is at present employed in one of the leading mills, making fancy cotton, and is an especially bright young man. Early training in Scotland. Has been in this country about four years.

1383 **English Woolen Designer.** 20 years in leading Yorkshire and Huddersfield mills as designer, supt. and weaver. Very large experience and would accept moderate salary in good mill. Age 36; married, English.

1445 **Designer or Finisher,** or will take position as supt. of a small mill. German, protestant, age 36, married. Has worked in several New England mills and refers to them. Graduate of the Werden Textile School, Saxony. Has worked on kerseys, beavers, cassimeres, cheviots, etc. Is familiar with all makes of American and German machinery.

1621 **Designer or Assistant Supt.** on men's wear worsteds, cotton worsteds, overcoatings, cassimeres. High and low stock. Has been designer in several first-class mills. Age 34; married.

1672 **Designer, Overseer of Weaving,** or assistant supt. Age 26; English; single. Has worked in various mills in England and this country. Holds first honors diploma for weaving and designing (London City Guilds). Fancy worsteds, dress goods, colored and fancy cotton goods.

1622 **Designer or Assistant Supt.** in woolen mill. Has made a specialty of steamer rugs and plaid back dress goods. Will start at $3 a day. Desires to change from present position on account of wife's health. An excellent opportunity to secure a first-class man at moderate wages.

FINISHERS.

1526 **Foreman of Finishing Room,** Folding, Packing, etc. Age 45; married; English. Has worked on white and colored goods and prints. Is acquainted with every kind of machinery used in his business. Has worked 11 years in this country. Can give good references.

1494 **Finisher on Felts,** or will take a position for the making of sizing. Age 26; single. His last position was engineer and in charge of sizing and finishing all classes of felts. Good references.

1692 **Cotton Finisher and Corduroy Cutter.** Age 31; English; married. Large experience in England and in this country. All classes of corduroys and velvets, cutting, etc., singeing and finishing of cords. Can furnish excellent references.

1661 **Overseer of Finishing.** Age 53; American, married. Large experience, and is familiar with Parks & Woolson and Curtis & Marble machinery. Has worked on cotton unions, dress goods, cassimeres, beavers, kerseys, coverts, army goods and worsteds. Can furnish excellent references.

1658 **Overseer Woolen Finishing** Age 35; married. A number of years' experience as overseer in first-class N. E. mills. Worked principally on kerseys, meltons, unions and cassimeres, and is familiar with Curtis & Marble, Parks & Woolson and Cleveland machines. First-class references.

MISCELLANEOUS.

1418 **Secretary** in superintendent's or office of overseer of weaving. Is familiar with books in use in all departments. At present, makes out orders for goods from raw cotton, and follow to finished goods ready for shipment. Also keeps up stock of supplies of all kinds. Has re-arranged shipping and warehousing. Introduced and worked out his present system for running mill, which has proved successful.

1583 **Cloth Room Overseer.** A young man having good experience as overseer in plain and fancy mills desires to change. Has worked on nearly all classes of cotton goods, and is recommended as a first-class figurer and good manager of help. Can take charge of cloth department and shipping where both positions are combined, or would accept position as office assistant. American; married.

1685 **Boss Dresser or Assistant Designer.** Has taken a thorough course in designing, and is well up in calculations and in the making of fancy men's wear goods of all kinds. Has worked in Scotland and three years in this country. His knowledge of yarn calculations and practical experience as dresser tender makes him well fitted to fill a position as boss dresser and to run a room in an up to date and efficient manner, or to fill a position as designer or assistant.

1678 **Overseer Dressing.** Experience covers one year as dresser tender and 16 years as overseer. Age 38; American; married. Has worked on worsteds, cheviots, cloakings and dress goods. Is familiar with Davis & Furber and Cleveland machines.

1675 **Bookkeeper and Paymaster.** Age 26; American; single. Has had five years' experience in all in N. E. mills. Not at present employed, and could take position at once. Would start at $12 or $15 a week.

1691 **Boss Spinner.** Large experience in first-class N. E. mills on flannels and all kinds of fancy cassimeres. Englishman; age 50; married. Refers to past employers.

1670 **Bleacher, Starcher or Finisher.** Age 44; English, married. Large experience. Will not work for less than $2.50 per day. Can furnish good references.

1667 **Overseer of Slashing, Spooling,** Warping and Drawing in. Age 39, and married. Has worked on all kinds of spoolers, warpers and slashers. Now employed as boss of slashing and drawing in, but is capable of handling a larger job than present one. Can furnish excellent references as to character, ability, etc.

1656 **A Practical Linen Spinner,** Weaver, Bleacher and Finisher of linen goods, also a practical linen finisher of cotton goods, over 27 years' experience in Ireland and America, is open for an engagement. Would go in with a company, putting his skill and ability against capital. Married. Best of references.

1659 **Bleaching Overseer.** Seven years' experience as overseer, and has first-class references. Has handled all classes of work in the cotton piece goods line, from heavy shoeduck, drills, etc. down to cheesecloth, and bag goods, also all kinds of colored work, such as colored bordered handkerchiefs, colored striped shirtings, colored spots, also white and colored towels, linen crash, all kinds of cotton flannels, etc.

Negro Labor in the Mills.

Editor Textile World:

Much has been said and written in regard to the introduction of negro labor in the Southern mills. When it became known that the Ashley & Bailey silk mill at Fayetteville, N. C., was to be operated entirely with negro help, much interest was felt, and many were the predictions of failure. I among others have watched the experiment with no small degree of interest. I have made two visits at different times to the mill, first when it was just starting up, and again after it had been running several weeks.

I, as a Southern man, and all my life familiar with the negro, have shared the doubts of others in regard to his becoming a successful mill operative. On my last visit I was surprised to find the same ones there at work that I saw on my first visit, as experience has taught me that they like frequent changes. I had an interview with Mr. Erskine, the superintendent, who is a negro far above the average in point of intelligence. He is from Pennsylvania, where he received good training as a manufacturer. He expressed himself as well pleased with the success he was meeting in training his help, and was deeply in earnest for the success of the enterprise and the elevation of his race. He informed me that he was very careful in the selection of his help, by taking only those of good moral character, and intelligence. He was very strict in his discipline and had no trouble in obtaining the very best of his race to work for him. He tries at all times to impress upon their minds the importance and necessity of promptness and steady habits. To illustrate how well he is succeeding on this line, he told me that on Thanksgiving day, though a legal holiday, not one of his hands was absent from his work. I saw them performing their duties in the mill, delicate though the work is, with apparent ease and skill. Some of them who have had only a few weeks' experience appear to be very efficient, and I am free to admit that I have a very different opinion of the negro as a mill operative from the one I formerly entertained. I am convinced that he can be taught to do the work; but I think it necessary to first train negroes for managers and overseers, and let them train the common help, for I do not believe white men can succeed with them as well as men of their own race, who will try to excite their racial pride, which greatly aids in making steady and efficient help.

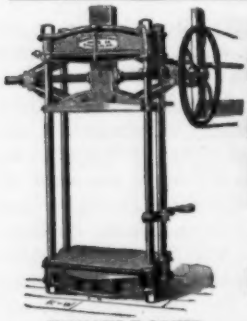
I expect in the near future to visit the cotton mill in Charleston, S. C., which is being operated with white overseers and negro help; also the cotton mill at Concord, N. C., which is owned by negroes; after which I will give the readers of the Textile World, if agreeable, the benefit of my observations.

TRAVELER.

English Exports of Textile Machinery.

The official statistics of the exports of textile machinery from Great Britain are just at hand, showing that the value of textile machinery exported in 1899 was larger than that of any previous year, though but slightly in excess of the value for 1898. The increase in the value of exports for 1899 over 1898 was in the exports to Russia, China, United States and to Continental Europe, outside of Germany, Holland and France. Below we give these statistics in detail:

To	1897.	1898.	1899.
Russia	£694,875	£1,268,281	£1,682,608
Germany	913,270	1,019,714	907,439
Holland	191,982	236,512	197,662
France	688,424	681,650	542,326
Other Countries in Europe	996,731	969,090	1,114,298
China (including Hong Kong)	142,387	116,741	190,261
Japan	607,705	287,245	95,815
United States	224,083	286,998	365,424
Countries in South America	125,665	124,646	122,479
British Possess'ns in South Africa	12,571	1,165	21,926
British E. Indies	937 726	1,293,315	1,051,496
Australasia	12,000	19,653	22,542
Other Countries	157,764	322,993	505,327
Totals	£5,702,183	£6,628,012	£6,819,598



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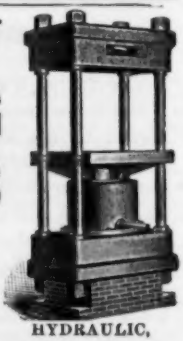
BOOMER & BOSCHERT

BALING PRESSES

ARE THE STANDARD.

Boomer & Boschert Press Co.

338 West Water St., SYRACUSE, N. Y.



HYDRAULIC.

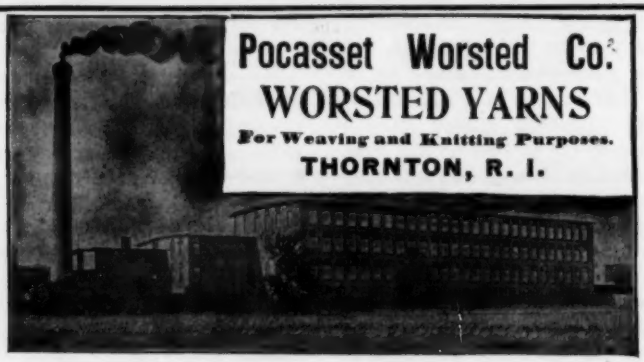
EASTON AND BURNHAM MACHINE CO.,

Pawtucket, R.I.

ALL KINDS OF Spindles USED IN THE MANUFACTURE OF COTTON, WOOL & SILK

IMPROVED UPRIGHT SPOOLERS

TO SPOOL FROM COP, SKEIN, OR BOBBIN.



Pocasset Worsted Co.

WORSTED YARNS

For Weaving and Knitting Purposes.

THORNTON, R. I.

Knitting and Weaving Yarns

Cones, Cops, Warps, Skeins,
Single, Double, Three-ply, etc.
Peeler, Egyptian, Mixed Colors.
Large Assortment.

EDWARD S. HYDE, 223 and 225 Chestnut Street, Philadelphia, Pa.

YARN DEPARTMENT.

Eastern Yarn Market.

Cotton Yarn: Cotton yarn spinners continue busy and prices for yarns keep advancing. Knitters are beginning to find fault with the continued advance. Since last year the prices on common carded yarn have advanced 5 cents per pound, notwithstanding the fact that spinners have had to pay but little more for raw cotton; although at the present time it looks as though this article would be higher, on account of the increased demand from England, due, no doubt, to the Boer war. Knitters have been having a good trade—both on fleece lined goods and on ribbed underwear. Fleece lined goods will undoubtedly be advanced in price. We note in connection with fleece lined goods that a larger percentage of these goods will be made with wool and merino backs, and cotton face ribbed underwear is selling well with prices maintained. The spinners of combed yarn, both Peeler and Egyptian, are now on light weights, and have a good trade with greatly advanced prices. There continues to be a good demand for mercerized cotton yarn for dress goods, and in connection with this it is noted that Bradford, England, exported many thousand yards of dress goods, made of mercerized cotton. The Southern mills are well employed at good prices, and are trying to get the trade on fine yarns from the Eastern mills.

Worsted Yarn: Spinners still continue busy on orders placed early in the season. At this writing weavers are waiting before placing further orders. The majority of weavers have covered themselves with yarns enough, in some instances, to last until October or November of the coming year. Those who are not entirely covered are waiting to see the trend of the buying before operating. It is stated that salesmen are booking larger orders for smooth fabrics than heretofore. On the other hand the larger mills are buying good quantities of ¼ to ⅜ blood wools for worsted yarns. The writer has been talking to one of the largest manufacturers of worsted cloth, and he stated that he was well covered, having on order over 1,000,000 pounds of yarn, and the spinners were shipping in with the greatest promptness. He was waiting for the woolen combines to open their line of fancy worsteds before coming in with his own styles. The manufacturers are full up to the top with wool and worsted yarn, and very much fear a decline in wools. The mills in the vicinity of Pascoag, R. I., at the request of buyers, opened their fancy worsted goods at fairly low prices, and have taken some good orders. They fear the combine, because they think that if it opens fancy worsteds and fails to get as much business as it expects, it will lower prices, and the Pascoag mills will get cancellations. Buyers do not want to purchase of the combine if it can be helped, and will give independent mills the first chance. Manufacturers state that piece dyes and clays have not opened within 12½ cents per yard of what they should on the present wool market. Weavers undoubtedly are going in to get all they can out of the buyer, as they think their golden opportunity has arrived. The spinners are all busy and salesmen do not bother the weavers to any extent. Some spinners keep a certain amount of yarn orders on their books, and when these run out they secure further orders, but are very conservative. On the other hand, buyers of worsted yarn say that when they wish to purchase more yarn they will buy only as they have orders. It is undoubtedly a fact that the trade is getting afraid of the high prices prevailing for yarn. It is stated that the woolen combine sold over $10,000,000 worth of goods at its sales of piece dyes and clay goods. The small clothing trade is having a

Frank E. Patterson, Prest. Oscar W. Wood,

GERMANTOWN SPINNING COMPANY INCORPORATED GERMANTOWN JAN. 9TH 1890

Germantown Spinning Co.

COTTON CARDED

HOSIERY YARNS

In numbers from 6s to 26s.

Germantown, Philadelphia.

W. Warren Thread Works,

SPOOL COTTON

on 100 to 12,000 yd. Spools or Tubes.

A Specialty of Thread for Manufacturers Use

on Spools, Tubes or Bobbins.

Also Seaming and Hosiery Yarns

on Cones, Tubes or Skein.

Our bleaching and dyeing facilities are new and unsurpassed for prompt and neat work. Correspondence solicited.

WESTFIELD, MASS.

The Best is the Cheapest.

It is BETTER and CHEAPER to wind yarn by the "Universal" system before shipment from the mill, thus insuring perfect delivery to knitting machines without rewinding.

UNIVERSAL WINDING CO.,

F. H. BISHOP, Manager.

226 Devonshire St., - Boston, Mass.

hard time. The cancellation of goods is being worked the other way. These concerns have been buying sample pieces, and then selling their cloth before buying in quantity, and even then they have not taken the cloth after being ordered. Now the agents and salesmen of the mills book orders and the prices are according to the cost of wool on delivery. If, at the time of delivery, the mills have more orders than they can handle, no delivery is made, the buyer being informed that he will have the first chance when they are able to deliver the goods. The result of this is that buyers do not know when they have bought goods, and are in great trouble, as they cannot meet deliveries on clothing sold. Buyers of fine underwear are keeping to the finer grades, notwithstanding the advance in price for this class of goods. The buyers of the yarns out of which these garments are made say that when next season arrives they will not pay the present prices for yarn, but will buy only as the orders for goods are received. Some of the knitters using French spun yarn have covered, others have not, and will only buy as orders are received. The top combers are very busy, and are holding firmly for higher prices. We note that several weavers are about to add drawing and spinning to their plants, and intend to buy tops rather than yarn, thus saving the profit of the spinners. Prices are firmly maintained.

Woolen Yarn: Spinners continue busy with orders which will keep many of them running night and day until September and October. In general, spinners have covered on stocks, and those not having done so are manufacturing yarn on commission, not caring to take chances on a speculative wool market. Some are ordering from hand to mouth in the belief that 12 o'clock has struck, and that before the season is over wool will be selling low enough to make a fair average of the year's buying. There will be much merino yarn used this year by the fleece-lined underwear trade. Sales-

CATLIN & CO.,
YARNS.
67 Chauncy St., Boston
216 Church St., New York.
206 Chestnut St., Philadelphia.

Walcott & Campbell Spinning Co,
IROQUOIS MILLS.
FANCY HOSIERY YARNS
IN ALL COLORS.
New York Mills, Oneida Co., N. Y.

JAMES E. MITCHELL & CO.,
Commission Merchants.
122 & 124 Chestnut St., Philadelpia, Pa.
74-78 Summer St., Boston.
Cotton, Woolen & Worsted Yarns.
All numbers on Hand and Made to Order.

Cohannet Mills,
TAUNTON, MASS.
Spinners of High Grade
HOSIERY YARNS OF EVERY DESCRIPTION.
Selling Agents JAMES E. MITCHELL & CO, Philadelphia and Boston.

TUCKER & COOK MFG. CO
MANUFACTURERS OF
WHITE AND COLORED COTTON **WARPS**
Nos. 6s to 30s,
On Beams, Jack Spools or in Chain
CONWAY, MASS.

GRANT YARN CO.,
COMBED AND CARDED COTTON.
YARNS 40s and above. AND
FITCHBURG, MASS. **WARPS**

E. JENCKES MFG. CO.
Colored Cotton, Hosiery, Woolen and Merino **YARNS**
PAWTUCKET, R. I.

LINEN YARN IMPORTER.
Hughes Fawcett, 115 Franklin St., New York,
Flax, Hemp & Jute Line and Tow Yarns,
FOR WEAVING PURPOSES
Linen Jacquard Harness Twines.
Fine Cotton Harness and Heddle Twines.
For Cotton, Silk, Woolen and Carpet manufacturers. Correspondence solicited. Samples promptly furnished.

CAPACITY, 50,000 Spindles.

ORSWELL MILLS

FITCHBURG MASS.

COMBED OR CARDED

COTTON YARNS

In Chains and Skeins, on Balls, Beams, Spools—single or twisted.

...CORRESPOND WITH THE...

American Moistening Company, Boston, Mass.,

And learn what their system of air moistening has accomplished. The

"DROSOPHORE" AND VORTEX" HUMIDIFIERS

Have been most advantageously adopted by the representative mills of this country. Our system will increase your production and overcome troublesome electricity, making your carding run much better. It will reduce your waste account, and generally prove a profitable investment. With our system a perfect **Spinning** or **Weaving** atmosphere in any climate or weather is assured, and any degree of humidity is obtainable. Will cool the air in warm weather, and warm it in cold weather. **Purifies the air and makes it healthier for the work people.** Write for Booklet on Humidification.

AMERICAN MOISTENING COMPANY, 150 Devonshire Street, Boston, Mass.

Cotton Warps.

WHITTIER COTTON MILLS,
LOWELL, MASS.

YARNS

SOLIS : : BOSTON.

179 Devonshire Street.

ANDREW J. SOLIS, Jr. & CO.

INDIAN ORCHARD COMPANY,

Indian Orchard, Mass.

Manufacturers of - - - -

COTTON WARPS AND YARNS

In gray and all colors, single or in any twist.

COLORED COTTON

Machined, Carded or in Roving.

NOVELTY YARNS

In Cotton, Mercirized Cotton, Silk and Worsted, in various Patterns, Colors and Twists.
We are always pleased to assist our patrons of the Woolen Goods manufacture in special pattern warps for samples.
We use a uniform grade of long stapled cotton in all our manufacture.

men are reporting good orders for this style of garment. The orders placed for the present are to be delivered in February for the backing of heavy weight worsted cloth, and woolen yarn to take the place of worsted yarns. There is much yarn being manufactured for French flannels and fine dress goods. The hosiery manufacturers are having late calls for woolen hosiery, and are therefore running and ordering woolen yarn later than is usual. Knitters of rubber boot linings are having many orders and are buying considerable woolen yarn. Spinners are advancing prices because labor, coal and almost everything which goes into the cost of manufacturing has advanced. As predicted, there will not be woolen spinning enough to satisfy the requirements of the trade, and the price of spinning will be higher on that account. The salesmen selling cloth report that the demand this year will run mostly to smooth cloth, which will require an additional amount of yarn. The spinners are all anxious about the uncertain wool market, and are interested to know the opinions of both sides on the question of price. Regarding the condition of the European market, the belief is held that that market is about to enter upon a period of decline especially on fine wool, which has advanced to an exaggerated proportion. It is stated that Europe has still large stocks brought over from the last sales, and has also been identified with some very important transactions on the markets of Australia and La Plata wools. For these reasons it is held that although the quantities shown at the London wool sales may be smaller, Europe has imported direct from Australia and La Plata, more wool than usual, and therefore will have much less need of covering. The speculative element in England is counting on the United States to furnish the purchasing element, and that thanks to this expected buying, the market price of raw wool in London is to be maintained. It is believed, however, that the exaggerat-

Eddy & Street,
YARNS
COTTON, WORSTED,
AND
WOOLEN, BRAIDS SPUN SILK.
PROVIDENCE, R. I.

A. HERBST. J. W. JONES.
HERBST & JONES,
KENNEBEC WORSTED MILLS.
Successors to Kershaw Worsted Co.
WORSTED YARN SPINNERS,
21st & Naudain Streets,
PHILADELPHIA.

C. MOORE & CO.,
MANUFACTURERS OF
TWINES, THREADS AND YARNS.
Jacquard Harness Twines of all kinds on hand and made to order.
S.W. COR. FIFTH & MARKET STS.,
Philadelphia.

RICHARD CAMPION,
Selling Agent for—
Bristol Worsted Mills,
Highland Worsted Mills.
17 Bank Street, Philadelphia, Pa.

FRENCH AND BRADFORD SYSTEMS
B. F. BOYER & CO.,
WORSTED YARNS
IN WHITE AND MIXES.
Woolen and Merino Yarns
OFFICE AND MILL
Delaware and Cooper Sts.
Camden, N. J.

DYE STICKS Drying and Sulphur House Poles of Natural Round Water Grown Cedar for Cotton, Wool, etc. Special Hardwoods in Standard No. 1 and "Selects" without knots, grades, for Silk Dyeing. Our Woven Cedar Picket Fence, is the best and cheapest for mills and all enclosures. Manufactured by, prices and all information from
E. M. HAEDRICH,
311½ Walnut St., Philadelphia.

DYE STICKS.
I make Kettle Sticks, Dry and Sulphur House Poles, also Sticks to suit the Wolstenholm Machine from natural water grown Cedar. I also make Sticks to suit the Klauder, Weldon, and Lorimer machines from finer grades of lumber. These Sticks have been thoroughly tested, and are pronounced the best on the market. I guarantee to give satisfaction to Dyers. Correspondence solicited. Write for prices.
FRANK BAILEY, Cedar Brook; P. O. Camden Co., N. J.

NEW ENGLAND THREAD CO.,

MANUFACTURERS OF

SPOOL COTTON IN NUMBERS FROM 8 to 100,

In All Grades and Lengths on Spools and Tubes.

Seaming Yarns on Cones; Polished Threads and Yarns on Bobbins.

DYEING AND BLEACHING of All Kinds of Yarns and Narrow Fabric a Specialty. Best of Spring Water for Bleaching.

PAWTUCKET, R. I.

THE WILLIAM CLARK COMPANY,

WESTERLY, R. I.

Mills equipped with the latest and most improved machinery.

Combed Egyptian from No. 20s to 100s. Combed Sea Island from No. 40s to 200s.

Also 2, 3, 4, 5 ply and 6, 9 and 12 ply cable laid.

Hosiery Yarns on Cops Tubes or in Skeins, Grey, Bleached or Dyed. (Fast Colors.

MONUMENT MILLS,

Manufacturers of

White, Colored, Fancy and Double and Twist, **COTTON WARPS**

HOUSATONIC, MASS. 4s to 60s.

GREENE & DANIELS MFG. CO.,

COMBED, CARDED AND GASSED

Yarns, Threads, Twines and Chain Warps,

Colored and Bleached Yarns Furnished in any manner desired by the trade. PAWTUCKET, R.I.

The J. R. MONTGOMERY CO.,

WINDSOR LOCKS, CONN.

Manufacturers of

Mercerized Cotton Yarns. GIVES THE HIGH SILK-LIKE LUSTRE IN KNIT GOODS AND WOVEN FABRICS

Novelty Yarns. BOUCLE, BOURETTE AND SPIRALS, IN COTTON, WOOL, WORSTED, MOHAIR AND SILK.

Cotton Warps. ON BEAMS, JACK SPOOLS AND TUBES. IN FANCY TWIST COLORS AND PRINTED.

HAYES, O. H. & CO.

Representative Lines of Woolens

O. H. HAYES & CO.

Liberal arrangements made with manufacturers or men controlling mills' productions.

ed price of wool cannot be maintained, and that raw cotton will be largely used. It is also known that German finances are in a bad condition. The London market opened off from 5 to 7 per cent. 18,000 bales were withdrawn from the market, and there has been a decline of from 1 to 3 cents per grease pound. The market has been very irregular. All this shows the folly of the American wool market using the London market as a crutch to rest on. It is thought that an advance in London would have started a further boom in wool, as though wool has not boomed enough already. Manufacturers have stated to writer that had the advance continued, they would have shut down their mills. There are those who still predict 80 cents for territory wool, and many must get high prices or lose money, as much wool held in Boston is owned at top market prices. Manufacturers are buying noils extensively, and some large orders have been placed at 60 cents per pound. Australian threads are in good demand, as all acknowledge that this is the cheapest stock to buy if Australian wool is wanted. We hear some talk that the reciprocity treaty with the Argentine Republic is having the effect to reduce the price of wool, but the "great men" of the woolen industry say that it will not be passed.

Philadelphia Yarn Market.

There is little change to note, in the position of the cotton yarn market, for the past month. While cotton has not been as strong as expected, the demand for yarn has kept all spindles busy, and prices have advanced considerably, especially in the finer numbers of Southern yarn.

Many spinners have taken orders to last six or eight months ahead, for a large part of their production, and yet there are customers who want to place further orders. The opinion from the South seems to be, cotton will be higher, which would help strengthen the position further yet.

WAVERLY WORSTED CO.
SPINNERS OF
WORSTED YARNS
FOR WEAVING AND KNITTING.
Main St. & Green Lane, Manayunk, Philadelphia.

DAVIDSON & BROOKE,
ORIANNA BLEACH WORKS,
Bleachers
Of Turkish Towels, Cotton Yarns, Underwear, Tapes and Hosiery.
2562-62-64 No. 3rd St., PHILA., PA.

EICHMANN & STERNBERG
530 Broadway cor. Spring St., NEW YORK.
Mercerized, Turkey Red, Gassed } Cotton Yarns.
Jacquard and Harness Twines.

We quote prices, about as follows:

Warps:—	
20/1	17
22/1	17½
26/1	18 to 18½
14/1	16 to 16½
16s	16½ to 17
14/2	17½
16/2	18½
20/2	19½ to 20
30/2	26
40/2	30 to 32
8/3	14½
Skein:—	
8s to 10s soft	14½ to 15
14s	15½ to 16½
16s	16½ to 17
20s	17 to 17½
19s	17 to 17½
8/3 hard	14 to 14½
14/2	16½
16/2	17
20/2	19 to 19½
30/2	25½ to 26
9/4 slack	15½ to 16
8/2 soft	15 to 15½
Southern Cones (various qualities):—	
6s to 8s	15½ to 16
10s	16 to 16½
14s	17 to 17½
16s	17½ to 18½
20s	19½ to 20
22s	20½ to 21
24s	21 to 22
30s	23 to 24
40s	30 to 31

HOWLAND CROFT, SONS & CO.

LINDEN WORSTED MILLS.

Fine Worsted Yarns

OFFICE AND MILLS:

Broadway and Jefferson Ave., Camden, N. J.

Represented by FIRTH BROADHEAD,
937 Banigan Building, Providence, R. I.

ALLEGHENY WORSTED MILLS,

Thomas Wolstenholme, Sons & Co., MANFRS. OF

ALL NUMBERS SINGLE AND TWO-PLY,

Worsted YARNS,

Sell Direct,

on Cop or in Skein, for Weaving and Knitting Purposes, in White, Natural & Fancy Mixes.

Office and Mills: Frankford Ave. and Westmoreland St., Phila., Pa.

CRANSTON WORSTED MILLS.

Worsted and Mohair Yarns—white or colors, in skeins, on spools, cones, or shuttle bobbins.

NOVELTY YARNS—of Mohair and Worsted. We are the only manufacturers in the United States making these yarns from the raw material to finished product and making Yarns **only.**

CENAPPED YARNS of all kinds. Doup Yarns. Harness Yarns. For Braids, etc.

...Dyers of Yarn and Slubbing...

BRISTOL, R. I.

George Campbell & Co.

Worsted Spinners.

Yarns, both French System and Bradford.

Knitting Yarns in all Grades and Mixes.
All Numbers to 60s.

21ST STREET AND WASHINGTON AVENUE, PHILADELPHIA.

MALCOLM MILLS CO.,

MANUFACTURERS OF

Novelty Yarns, Silk Noil Yarns, in Fast Colors AND White.

Mills, Frankford, Pa. Office, 229 CHESTNUT ST., PHILA.

Shuttle Cops:—

6s to 8s	14½ to 15
10s to 12s	15 to 15½
16s	15½ to 16
40s	22 to 23

Eastern Hosiery Yarn:—

Basis of 17½c. for 10s cones.
Cops, ¾c. less up to No. 16s.
" 1c. less 17s to 22s.
" 1¼c. 23s up.

Combed yarn is very scarce, and prices are very firm.

Woolen and merino yarns are in good demand. Prices firm and advancing.

—The National Flax, Hemp, and Ramie Association held a two days' session in Fargo, N. D., recently, with a large attendance. The phenomenal growth of flax raising in North Dakota and Minnesota led the association to meet at this place. North Dakota raised over a third of the flax crop of the country last year. This was partly due to the establishment of fibre mills in the Red River valley, which furnish a market for the straw which has hitherto been burned. It now, after being worked up into fibre, goes to Niagara Falls, where it is made into manila paper. Mayor Johnson delivered an address of welcome, after which committees were appointed. The afternoon was devoted to papers on various phases of flax culture.

—Angora goats should have their own way as much as possible, and the less they feel the government they are subjected to the better they will do.

—It is well known that during the oxidation of aniline hydrochloride into emeraldine considerable quantities of hydrochloric acid are liberated, the pernicious action whereof on the vegetable fibre is sometimes felt to a disastrous extent.

—No State better illustrates the capabilities of development in any manufacturing line than little Rhode Island, smallest of all our States, save one, in territory, yet standing only fourth from the top in wool manufactures, and second only to Massachusetts in cotton.

—According to that famous expert, Henry O. Binns, the craze of crossing the Angora with the Kurd goats, was from 1863 to 1876. It was, therefore, not very difficult to recognize the crosses, even during the first six or eight years of that period, whilst towards the end of it, many really lowbred animals, might have passed even for choice goats, if only judged by their appearance. What was brought to Australia, was either bought entirely before the above mentioned period, or during its very first years.

SILK NOILS AND SILK NOIL YARNS
IN WHITE AND COLORS.
MOHAIR LOOPS, KNOTS, AND FANCY YARNS FOR DRESS GOODS AND CLOAKINGS.
A. T. SKERRY & CO., 47 LEONARD ST., NEW YORK.

Tower & Wallace,
ASHLEY B. TOWER, M. AM. SOC. C. E.
BROADWAY AND 25TH ST., NEW YORK.

ARCHITECTS AND ENGINEERS,
Cotton, Woolen and Silk Mills,
POWER DEVELOPMENT AND TRANSMISSION.

AMERICAN YARN PRINTING WORKS. JOHN FORREST Printer of Cotton, Woolen, Silk and Worsted Yarns and Warps for Woven and Knit Goods. Bleaching of Cotton and Woolen Yarns a Specialty, 134 to 150 North 22d St., Philadelphia, Pa.

WM. DUDLEY, Pres. ISAAC H ROGERS, Treas. JOHN MCPARLAN, Mgr.
PHILADELPHIA LINEN FINISHING COMPANY,
BLEACHERS AND FINISHERS OF LINEN
Towels and Damask, also Turkey Red Damask, Centre Covers, Doylies, Napkins, Carriage Robes, Dusters, etc.
Frankford Ave. and Tacony St., Frankford, Phila., Pa.

CHENEY BROTHERS,

SILK MANUFACTURERS.

ALL KINDS OF

Knitting Silks, Ribbons AND Piece Silks,

USED FOR TRIMMING KNIT GOODS.

TRAMS, ORGANZINES and SPUN SILKS, in the Hank, or on Spools or Cones, for Manufacturers' Use. Silk for Special Purposes Made to Order.

MILLS: South Manchester and Hartford, Conn.

SALESROOMS: 477, 479 and 481 Broome Street, NEW YORK.
929 Chestnut St., PHILADELPHIA.
79 Chauncy Street, BOSTON.
186 Franklin Street, CHICAGO.

WILLIAM RYLE & CO.,

DEALERS IN

Domestic Thrown Silk of every description. Fine Pure Dye Silks for the woolen trade a specialty. Foreign and domestic

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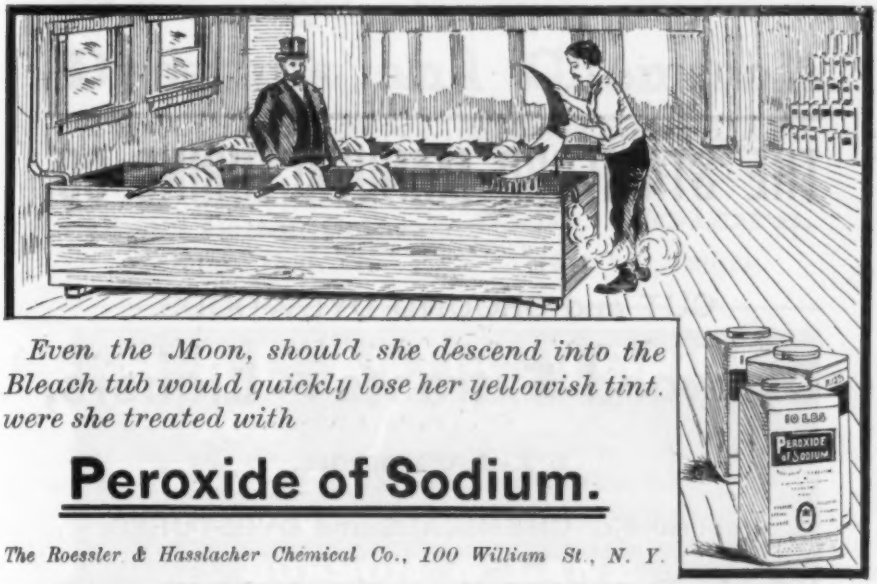

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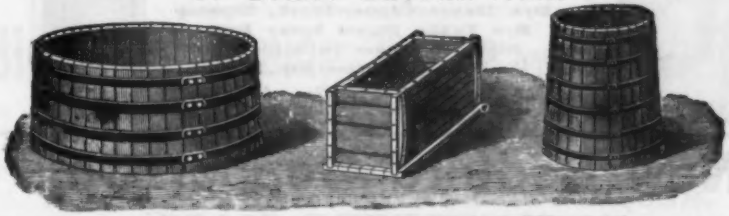

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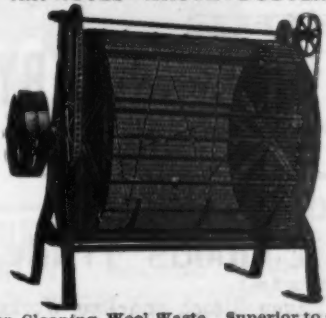

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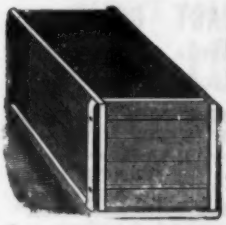

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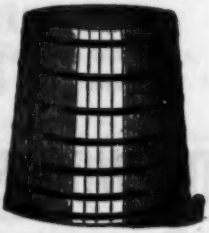

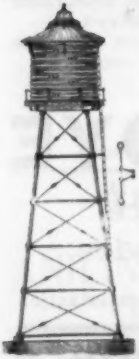

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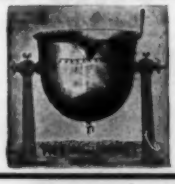

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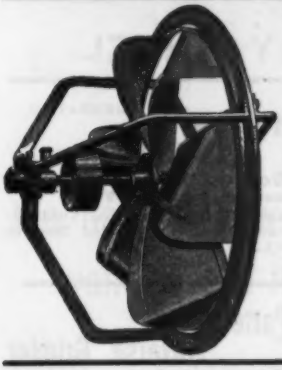

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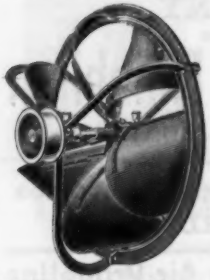

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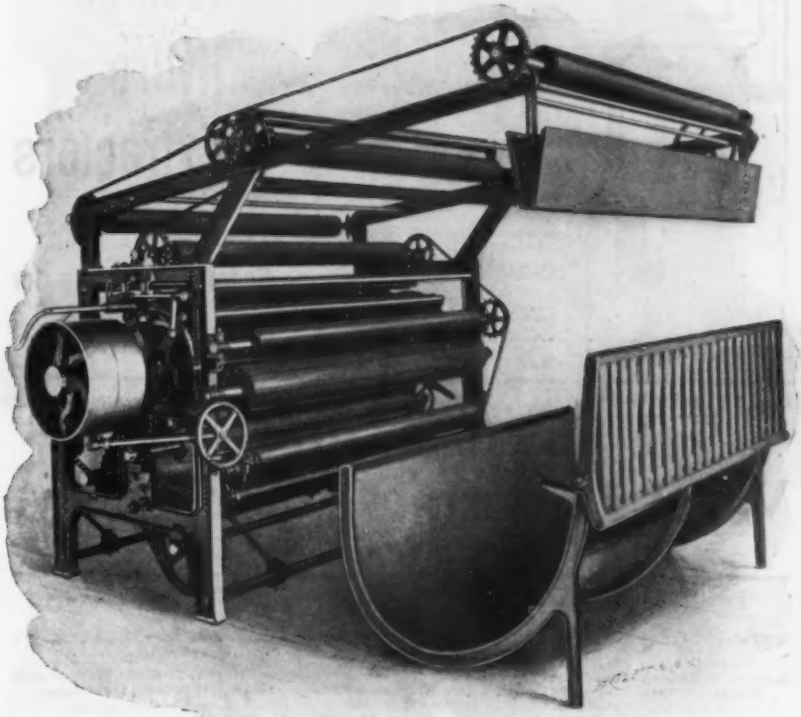

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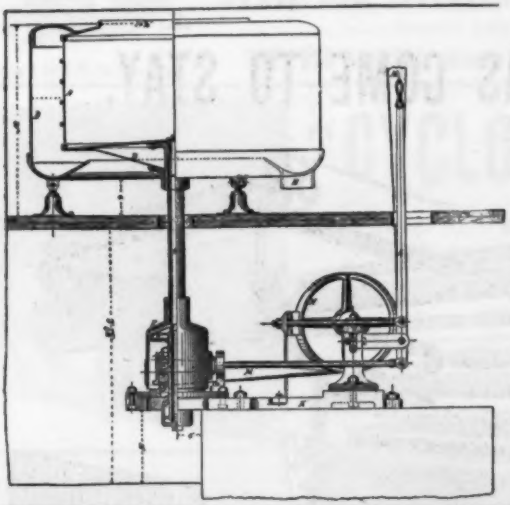

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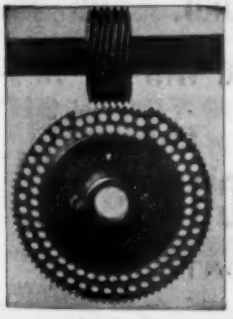

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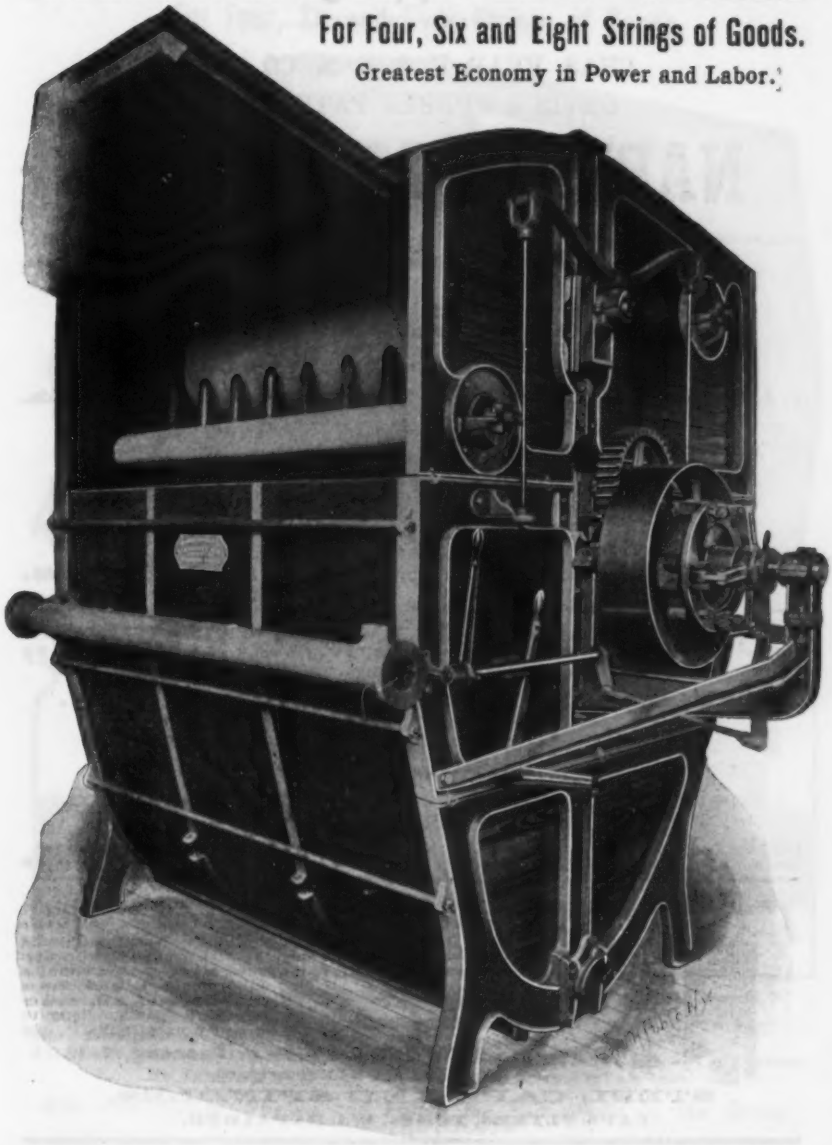

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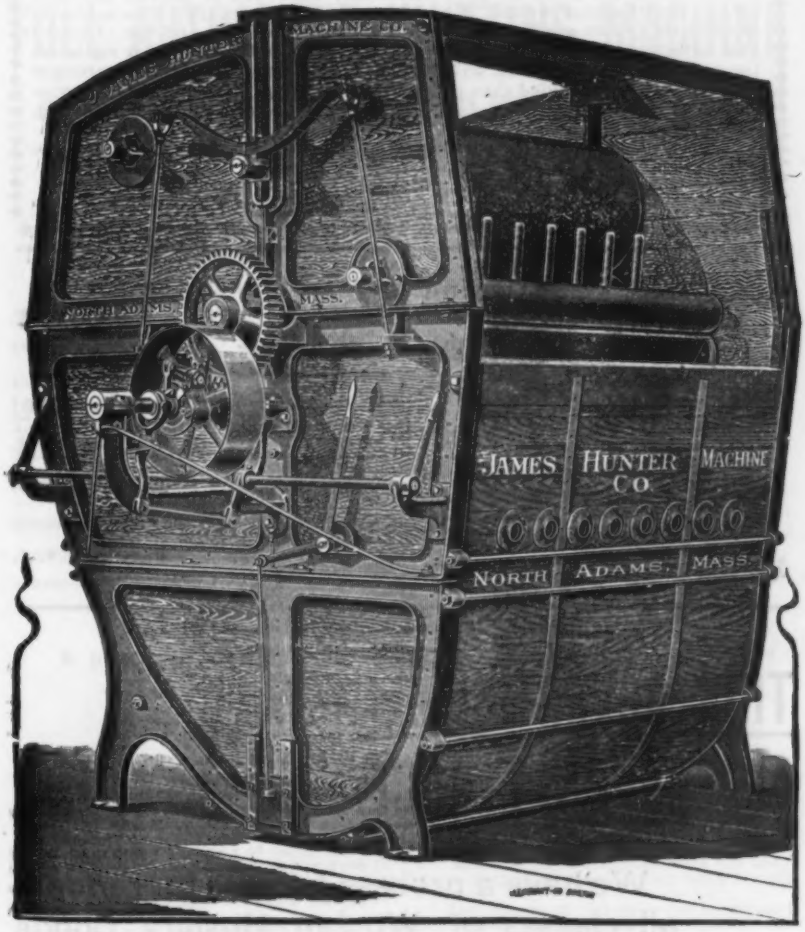

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Less power required than for any other Washer of equal capacity.
All Main Bearings are adjustable. All Bearings are on the outside of frames.
No dripping of Oil on the Goods, or in the Wash Box.

Also Combination Washer and Fuller for Knit Goods in the String.

Write for further particulars and prices

JAMES HUNTER MACHINE CO.,

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Boston Office, Room 67, Mason Building, 70 Kilby St.

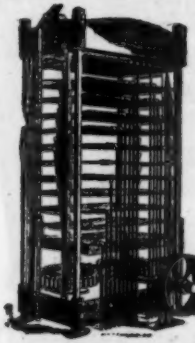
Long Distance Telephone, 2954.

THE LATEST IMPROVED BOLETTE CONDENSER.

My machine embodies the results of long practical experience with the Bolette system. This system is acknowledged superior to any other condenser on the market. It is universally employed in Europe and very largely by the best woolen manufacturers in this country. The merits of the Bolette system are too well known to need discussion, and the object of this advertisement is to impress upon woolen manufacturers that my latest improved Bolette is the best on the market. It is less complicated, stronger and more readily handled than other makes. It is perfect in mechanical construction, and made to absolute standard sizes. Gears are covered with safety gates.

I can also supply the best imported and domestic perforated and corrugated aprons for any rub motion.

ROBERT HUNTER, 1525 Clearfield St., Philadelphia, Pa.



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CRAWFORD Hollow Steam Plate Press

FOR KNIT OR WOOLEN GOODS.

The most reliable machine of the kind on the market.

J. J. Crawford & Son, Nashua, N. H.

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SPINDLE HOOK BAND

Which we are selling at **$6.00 per 1000?**

The finest article on the market to transmit power from cylinder to spindle on Silk, Cotton, Woolen and Flax Spinning Machinery.

Send today for free samples, stating what lengths of Bands required.

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Manufacturer of and dealer in Mill Supplies . . .

THIS ADVERTISEMENT WILL APPEAR ONLY ONCE.

We have a process for sale for rendering all classes of Woolen Hosiery Goods Unshrinkable and Non-Felting. The process is inexpensive and quick and does not impair the softness and color.

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Cable Address, WILDT, Leicester.
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THE INVINCIBLE

FULL AUTOMATIC KNITTING MACHINE

IS ADAPTED TO THE ECONOMICAL PRODUCTION OF ALL CLASSES OF SEAMLESS HOSIERY.

• • •

It is the only full automatic machine made to be fastened to a bench, occupying no more space than semi-automatic machines.

• • •

It has a simple and positive attachment for putting in and taking out an extra thread in heel and toe automatically.

• • •

• • •

A simple and positive attachment can be applied for **making high spliced heels and double soles automatically,** at the same time the heel and toe are reinforced by an extra thread. The splicing arrangement is supplied with yarn from a bobbin holding a quantity of yarn, and not from a small cop such as is usually used in devices of this kind.

The only successful yarn changer is applied to this machine. This device changes the yarn automatically at heel and toe, or at any desired point in the knitting of the stocking. It does not require a revolving bobbin which is commonly used in similar devices, but allows the use of a full size winder bobbin or cone for each yarn used. It is perfectly positive in its operation, is simple and well built, and is recommended as filling a popular demand.

In knitting "string work," **a loose course** is put in as a guide for cutting off each stocking. **A loose course can be be put in for looping** the toes. This is a great advantage in fine gauges.

Attention is invited to the new method of transferring tops to the needles of machine in knitting Half Hose, and in footing ribbed leg hose.

The method of doing this is entirely new, and must not be confounded with the ordinary method of transferring with a quill ring.

The speed of the machine is reduced just before changing from circular to reciprocatory knitting, thus avoiding all shock. All parts are interchangeable.

By changing cylinders only, the machine will make either fine or coarse gauge of goods.

The Invincible is a compact, light running, full automatic machine, simple in construction, has few parts runs at high speed, occupies a small space, and is put upon the market at a price that defies competition from either full or semi-automatic machines.

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MANUFACTURERS OF

Circular Rib Knitting Machinery,
Underwear Machinery,

For Ladies' Vests, Combination Suits, Corset Covers, etc.
Men's Underwear, Sweaters, etc.

New Improved Sleeve Machines.
Machines for Rib Hosiery, Rib Tops and Cuffs.

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MECHANICAL STOP MOTIONS
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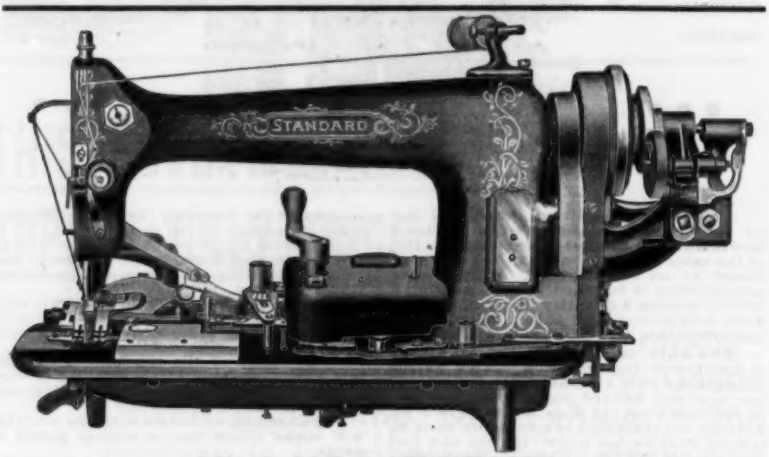

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3 Will cut heaviest material.
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6 Tensions on *both* threads—holes solidly set
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8 Makes whip-stitch button holes.
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10 Makes button holes one-eighth to one inch.
11 A positive, automatic stop motion.
12 More work produced with less effort.
13 Most money making machine in any factory.
14 Of highest grade workmanship and durability.

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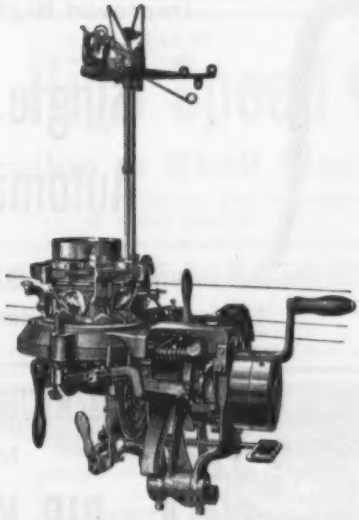

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Loopers and
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for Plants
Complete.

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All Sizes and All Gauges.

WINDERS and BOBBINS. HAND FORGED STEEL CYLINDERS.

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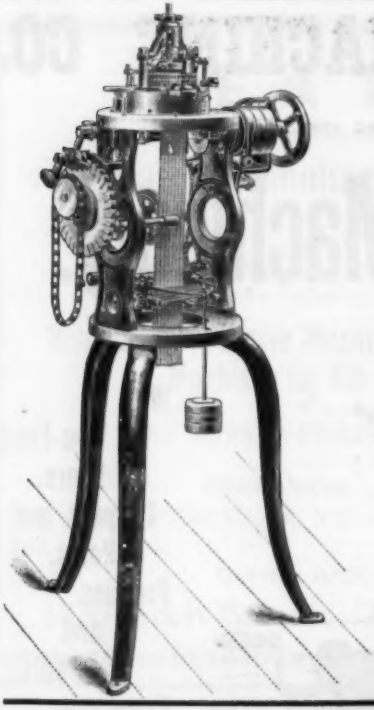

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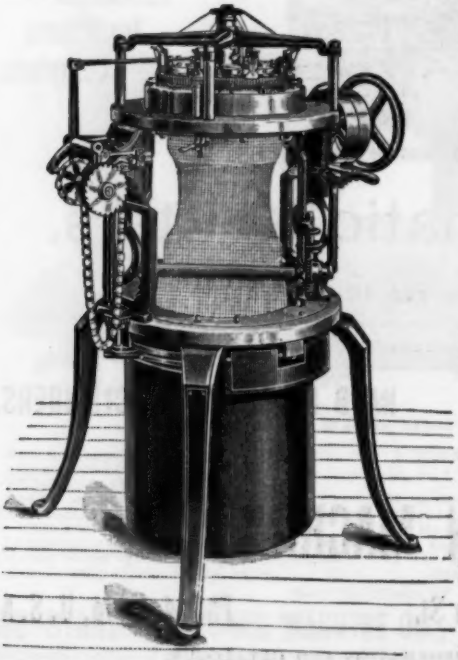
Single Feed Automatic Ribber

With Welt and Slack Course for Half Hose Tops and Rib Legs, Etc.



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AUTOMATIC AND PLAIN,

For all classes of Ribbed Hosiery and Underwear, Combination Suits Sweaters, etc.

ESTABLISHED REPUTATION FOR

Largest Production, Best Quality Fabric, Durability, Economy of Operation.

Full particulars, Description and Samples furnished upon Application to the

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To Seamless Knitters, make Old Machines into New Ones, and the Best of their respective classes.

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For finishing the edges of Knit Goods, Bed Blankets, Horse Blankets, or other fabrics.

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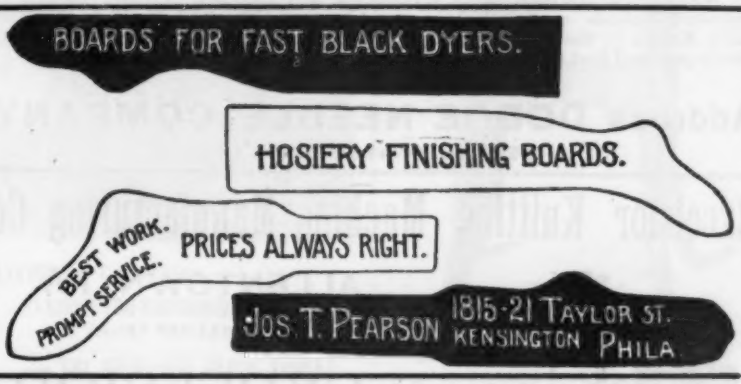

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Process For Sale

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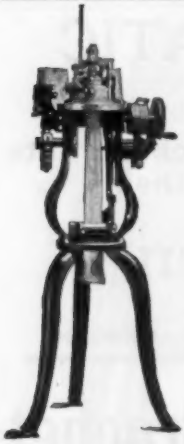

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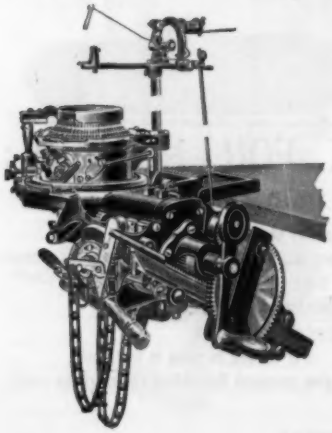

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7-8 AUTOMATIC KNITTERS,

Adapted for Ladies' Plain Hose, Men's Half Hose or footing Ribbed Hose.

Its Production is Greater than any 7-8 or full Automatic Machine now on the market.

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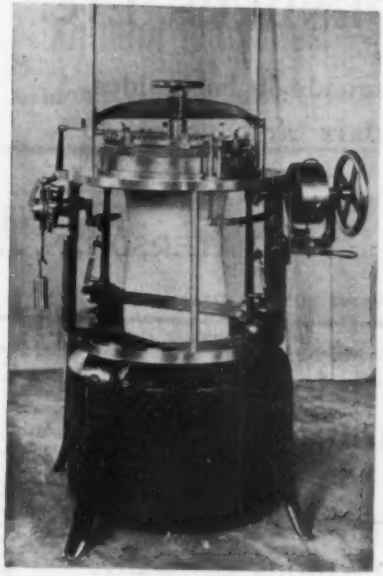
Circular Rib Machines

Of Highest Speed, Less Needle Breakage, Less Seconds, Largest Production.



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STRIPER FOR RIB GOODS.
24 feeds. Cut 14 to inch.

THE UNIVERSAL CLOTH TURNER
with radical improvements.

ROTARY STEAM PRESS
for steaming, pressing and drying in the roll.

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THE UNIVERSAL UPRIGHT DRYER.

Our machines are all of new design from new patterns and of best material and good workmanship and sold at fair prices. Send for catalogue and estimates.

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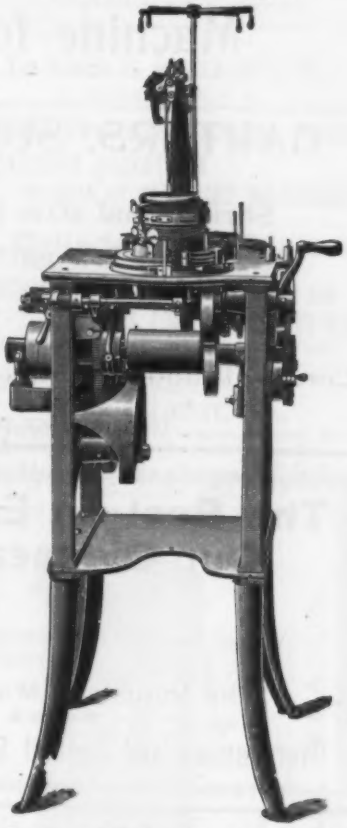
Automatic Knitter,

FOR SEAMLESS HOSIERY.

All Kinds and Gauges.



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The Elastic Web Callendering Machine for Finishing .....

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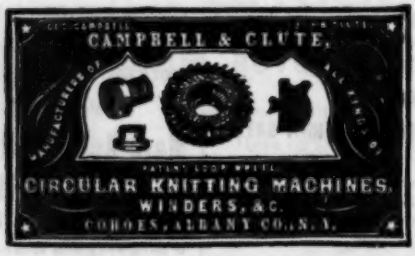

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CLOTH CUTTERS—Power and Hand.
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Irregular Form
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Over 1000 machines now in operation.
Just now we are making a speciality of 14 and 16 feed machines for stripes.

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CARDIGAN JACKET and CIRCULAR KNITTING MACHINES
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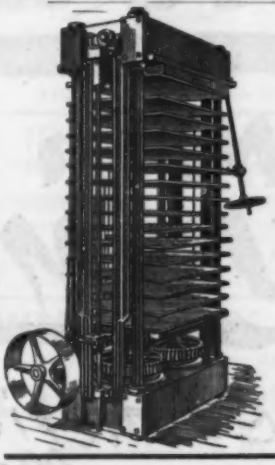

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For Hosiery, Shirts, Drawers, Jersey Cloth and Stockinet.
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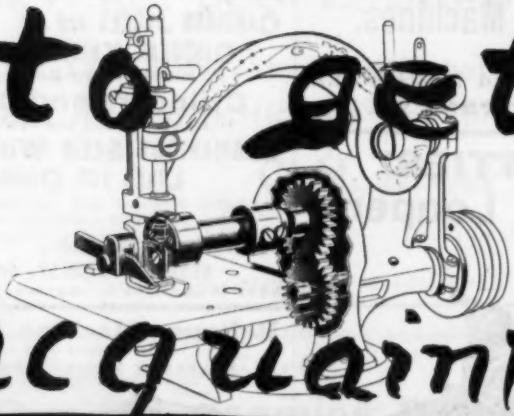

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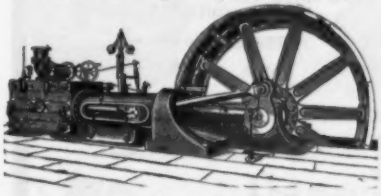

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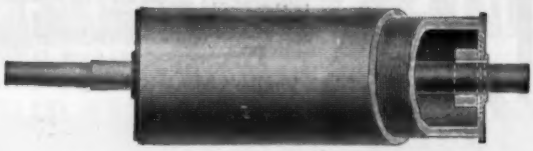

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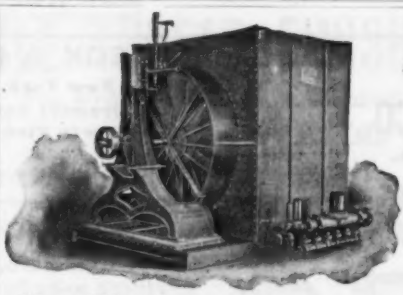

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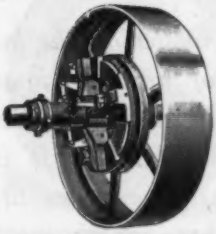

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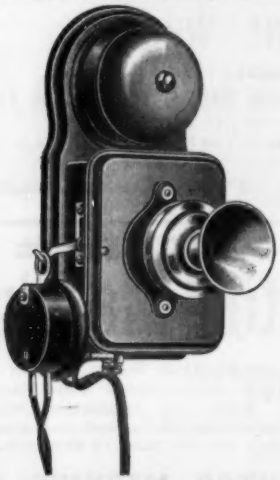

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